

JOURNAL

OF THE

AMERICAN VETERINARY MEDICAL ASSOCIATION

GENERAL ARTICLES

| | |
|---|----|
| Canine Urolithiasis— <i>Robert S. Brodsky</i> | 1 |
| Recruitment and Training of Veterinary Research Pathologists— <i>William H. Feldman</i> | 10 |
| Developments in Operations of the National Board of Veterinary Medical Examiners— <i>L. C. Payne and J. G. Hardenbergh</i> | 14 |

SURGERY AND OBSTETRICS

| | |
|---|----|
| Surgical Correction of Complete Luxation of the Elbow in the Dog— <i>Robert L. Leighton</i> | 17 |
| An Anesthetic Accident with a Skunk— <i>Raymund G. Vernon</i> | 19 |
| Aureomycin for Retained Placenta in the Cow— <i>H. L. Easterbrooks and W. N. Plastridge</i> | 21 |
| Use of Radon Implants in the Treatment of Bovine Ocular Neoplasms— <i>R. F. Vigue</i> | 23 |

CLINICAL DATA

| | |
|--|----|
| Visceral Lymphosarcoma of the Cat. II— <i>Jean Holzworth and Svend Woge Nielsen</i> | 26 |
| Studies of the Pharmacodynamics of Succinylcholine Chloride in the Horse— <i>Theodore H. Bellring, Jr., and Nicholas H. Booth</i> | 37 |
| Auricular Fibrillation in Horses— <i>D. K. Detweiler</i> | 47 |
| What Is Your Diagnosis? | 51 |
| Nitrate Poisoning in Cattle Due to Ingestion of Variegated Thistle, <i>Silybum Marianum</i> — <i>Kendrick—Tucker—Peoples</i> | 53 |
| Salmonella Isolations from Dehydrated Dog Meals— <i>Galton—Harless—Hardy</i> | 57 |
| Brucellosis and Leptospirosis Serological Test Results on Serums of Wisconsin Veterinarians— <i>Morse—Allen—Worley</i> | 59 |
| A Case of Canine Tetanus— <i>W. E. Blake</i> | 60 |

NUTRITION

| | |
|---|----|
| Trace Minerals in Cattle Rations— <i>Swenson—Goetsch—Underbjerg</i> | 62 |
|---|----|

EDITORIAL

| | |
|--|----|
| An Analysis of Veterinary Medical Education as It Applies to the Southern Regional Area | 64 |
|--|----|

(Contents continued on adv. pages 2 and 4)



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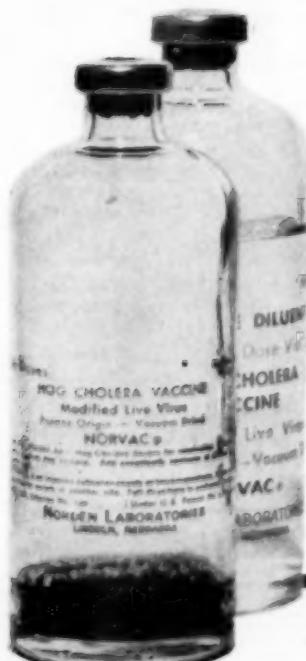
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CONTENTS

(Continued from Cover)

SURGERY AND OBSTETRICS

| | | | |
|---|----|------------------------------------|----|
| Inseminating a Bitch with Preserved Semen | 20 | Multiple Ova in Graafian Follicles | 25 |
| Inositol in Boar Seminal Secretion | 20 | An Unusual Ectopic Pregnancy | 25 |
| Effect of Relaxin on Milk Ejection | 22 | Induced Ovulation and Insemination | 25 |

CLINICAL DATA

| | | | |
|--|----|--|----|
| Infectious Myelitis of Cats | 36 | Calf Cud Inoculation Ineffective | 58 |
| Eye Changes in Dapple-Colored Dogs | 36 | Oral Vaccination for Newcastle Disease | 60 |
| Succinylcholine in the Placement of Hip Joint Prostheses | 42 | Cortisone, a Triple-Edged Sword | 60 |
| Can Phenothiazine Depress Horses? | 46 | Succinylcholine in Tetanus in Man | 61 |
| ACTH for Equine Laminitis | 50 | Tetanus Immunity Oddities | 61 |
| A Test for Avian Lymphomatosis | 56 | Pitch Poisoning in Pigs | 61 |
| Streptococcal Arthritis in Pigs | 56 | Heredity and Swine Erysipelas | 61 |
| Psittacosis Control | 56 | Psittacosis Control by Antibiotics | 61 |
| Outbreak of Pasteurella Mastitis | 58 | Amebic Infections in Dogs | 61 |
| Methionine for Ketosis in Ewes | 58 | New Synthetic Hormones for Arthritis | 61 |

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CONTENTS—Continued

NUTRITION

| | | | |
|---------------------------------------|----|--------------------------------------|----|
| Animal Fats in Feeds Increasing | 62 | Pseudovitamin B ₁₂ | 63 |
| Opinions on Dairy Calf Feeding | 63 | Cobalt Deficiency in Ruminants | 63 |

EDITORIAL

| | |
|-------------------------------------|----|
| A Challenge to the Profession | 65 |
|-------------------------------------|----|

CURRENT LITERATURE

ABSTRACTS

Effect of Age and Pregnancy on Ovine Blood Protein Fractions, 66; Rhabdomyosarcoma in a Dog, 66.

FOREIGN ABSTRACTS

Experimental Therapy for Brucellosis, 66; Diagnosis of Carriers (Bulls) of *Vibrio Fetus*, 66; Diagnosis of Infectious Anemia in Horses, 66; Use of ACTH in Acetonemia, 67; Deodorizing Action of Chlorophyll, 67; Proceedings, Second Asian Conference of the International Office of Epizootics, 67.

BOOKS AND REPORTS

Artificial Breeding and Livestock Improvement, 68; Microbiology of Meats, 68.

THE NEWS

| | | | |
|---|----|--------------------------------------|----|
| Minneapolis Is 1955 Convention City | 69 | Applications | 76 |
| News from Washington | 71 | Among the States and Provinces | 77 |
| Veterinarian Wanted by Guam Government | 72 | Veterinary Military Service | 83 |
| Student Chapter Activities | 72 | Births | 83 |
| Women's Auxiliary | 73 | Deaths | 83 |
| U. S. Government | 75 | | |

MISCELLANEOUS

Fluoridation in Britain, 9; Pleuropneumonia-like Organisms, 9; A European Foot-and-Mouth Disease Commission, 9; Shipping Fever in Canada, 9; Foods Beat Population Increases, 13; Adrenal Hormone for Tetanus in Man, 13; Objectives of the American Board of Veterinary Public Health, 13; Notes on Prostatic Cancer, 13; U. S. Livestock Sanitary Association, 43; Horsepower on United States Farms, 46; Vampire Bat Distribution in Mexico, 63; Botulism Outbreak in Mink, 63; International Sheep Dog Trials, 65.

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AVMA ★ Report

Veterinary Medical Activities

♦ The Board of Governors (Drs. S. F. Scheidy, chairman; A. H. Quin, and Floyd Cross) met at Association headquarters, November 30.

* * *

♦ The winter meeting of the AVMA Executive Board was held in Chicago, December 1-3. Dr. J. M. Arburua, District VI, was unable to attend due to the illness of Mrs. Arburua. Dr. C. F. Schlotthauer, District V, was confined to his home because of a back injury.

* * *

♦ Dr. R. A. Hendershott met with the Executive Board on December 2 to discuss the possibility of having a joint meeting of U.S.L.S.A. and AVMA at San Antonio, Texas, in October, 1956.

* * *

♦ The Executive Board set October 15-18 as the dates for the AVMA Ninety-Third Annual Meeting to be held in San Antonio, Texas, in 1956.

* * *

♦ Assistant Executive Secretary Kingman met on December 7 with the Committee on Local Arrangements for the 1955 Annual Meeting in Minneapolis.

* * *

♦ Editor W. A. Aitken attended the annual meeting of the Nutrition Council, American Feed Manufacturers Association, held in Chicago on December 1.

* * *

♦ The AVMA Committee on Parasitology met at Association headquarters on November 30. The Committee developed recommendations to be submitted to the Agricultural Research Service, U.S.D.A., pertaining to assignment of research on insects affecting livestock and poultry.

* * *

♦ The AVMA Committee on Nutrition met at Association headquarters on November 29. Preliminary steps were taken in organizing an association of veterinarians in nutrition. The members of the subcommittee appointed to conduct the preliminary work of this group are Drs. M. Erdheim, R. E. Lubbehusen, and W. D. Pounden.

* * *

♦ Dr. Gregorio C. Goloyugo, assistant chief of the Veterinary Research Division, Bureau of Animal Industry, Philippine Islands, visited Association headquarters on Nov. 17, 1954, and conferred with staff members on various aspects of animal disease control, production and use of biological products, and the work of the AVMA in relation to the Philippine association. Dr. Goloyugo is spending several months in the United States making observations and studies of animal disease control programs and related matters.

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1. Belling, T. H., Jr.: Studies on the Pharmacodynamics of Succinylcholine Chloride in the Horse, *J.Am.Vet.M.A.* 124: (Jan.) 1954.

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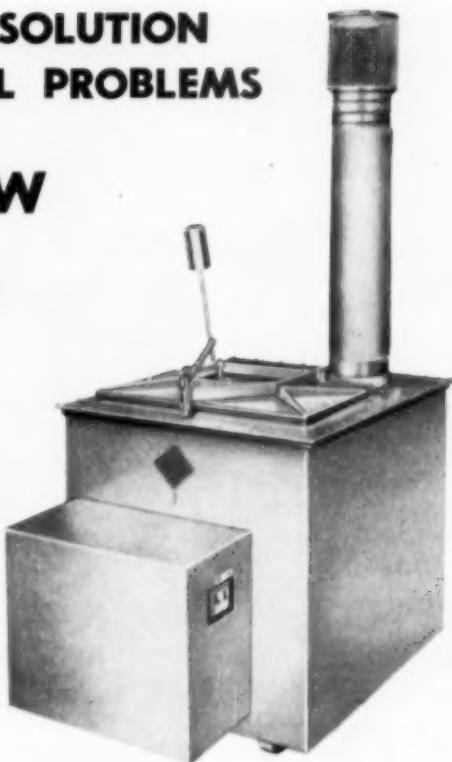
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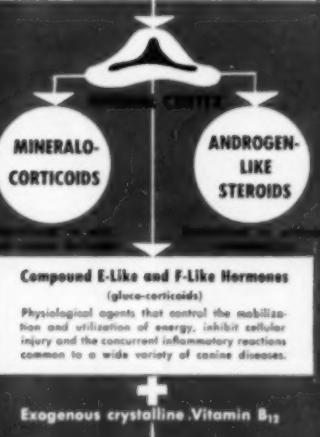
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1. Grumbles, L. C., Wills, F. K., and Boney, W. A.: J. Am. Vet. M. A. 124: 217, 1954. 2. Smith, H. W.: Vet. Rec. 66: 215, 1954. 3. Cosgrove, A. S.: Vet. Med. In press.

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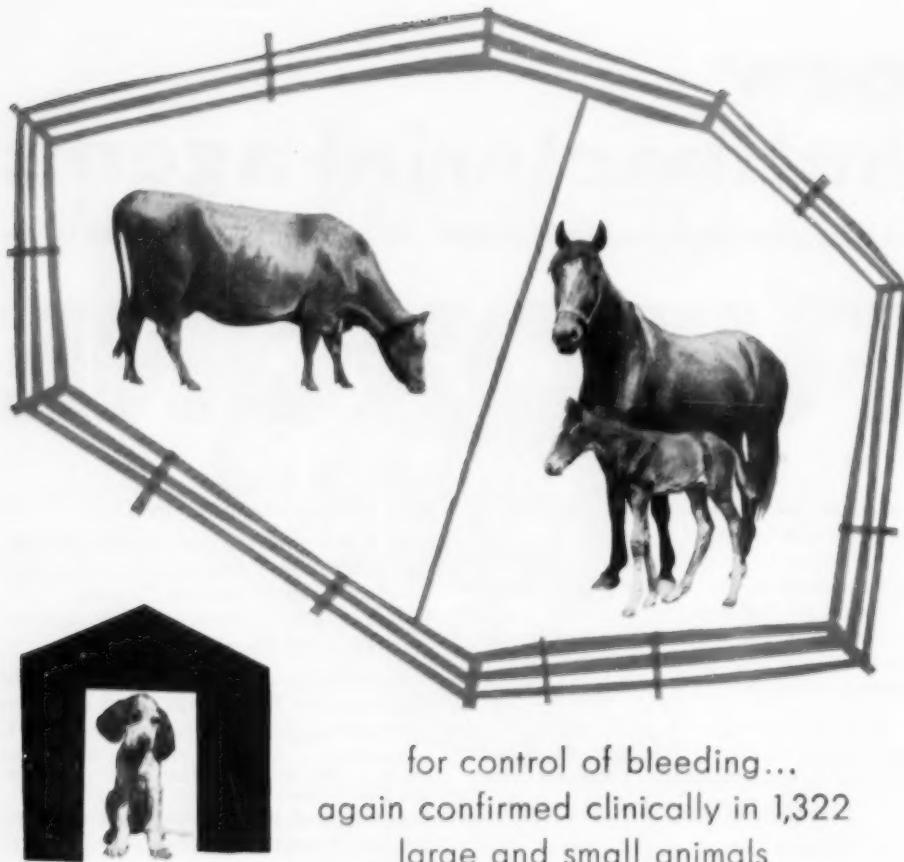
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*Rachman, M., and Frucht, T. R.: Vet. Med. 49:341, 1954.

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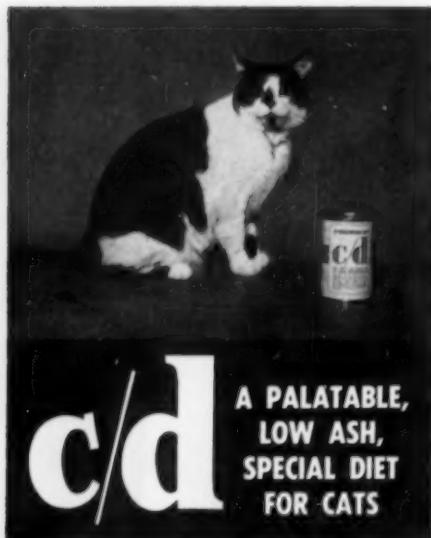


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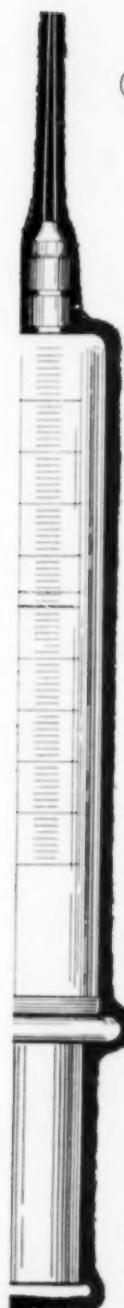
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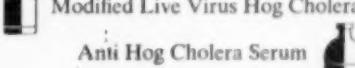
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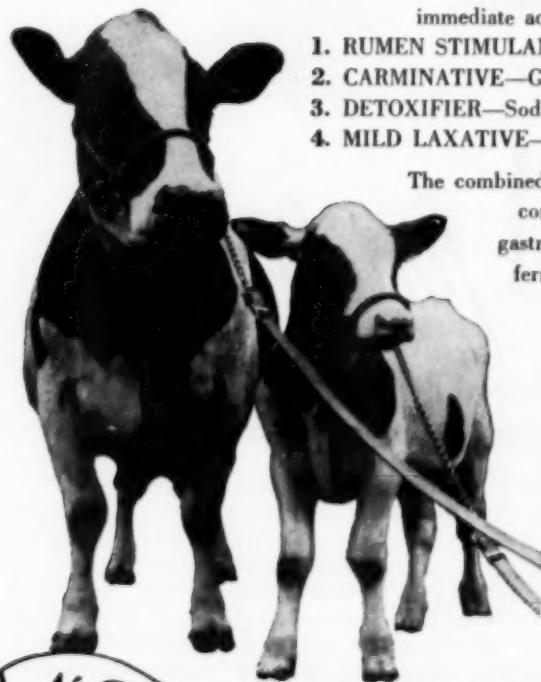
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Canine Urolithiasis

A Survey and Discussion of Fifty-Two Clinical Cases

ROBERT S. BRODEY, D.V.M.

Philadelphia, Pennsylvania

THIS REPORT concerns 52 cases of canine urolithiasis. Most of these animals have been treated surgically or medically in the veterinary hospital at the University of Pennsylvania from July, 1951, to July, 1954.

The main purpose of this investigation was to discover the important factors of urinary lithiasis in the dog so that this information could be used to plan an effective program designed to prevent recurrence of calculi postoperatively. The information obtained in this study will be presented and briefly discussed in order to familiarize the clinician with the clinicopathological observations noted in dogs affected with urinary calculi.

SEX INCIDENCE

The following observations were made:

- 1) Of the 52 animals, 27 were males and 25 were females.
- 2) Of 42 cases of phosphate lithiasis, 25 occurred in females and 17 in males.
- 3) All 10 cases of uric acid lithiasis were in males.
- 4) Of 5 cases of renal lithiasis, 3 occurred in male dogs with uric acid stones; and of 2 dogs with phosphatic stones, 1 was a female, the other a male.
- 5) Of the 27 male dogs with urolithiasis, 17 had phosphatic calculi and 10 had uric acid calculi.
- 6) Of 35 cases of urinary infection, 22 occurred in females and 13 in males.

From the School of Veterinary Medicine, University of Pennsylvania, Philadelphia.

COMPOSITION OF CALCULI

In this study, analysis was done mostly by standard chemical methods. In those cases where the chemical analysis was uncertain or when the stone was too small for accurate chemical studies, spectrographic analysis was performed.

1) Forty-two of the 52 dogs had phosphate calculi; these stones were either ammonium magnesium phosphate (triple phosphate) or calcium phosphate. Many of these calculi contained small amounts of fibrin, uric acid, cholesterol, oxalate, and carbonate. Multiple stones in the bladder usually were pyramidal with smooth-surfaced facets, whereas solitary cystic stones were ovoid with irregularly pitted surfaces. On cross section, these stones were chalky white, concentrically laminated and often contained soft brownish amorphous central zones. In two instances (cases 8 and 26) silk sutures were located in the center of each stone. In some cases, the calculi were sabulous, and impacted masses of these stones along with mucin, pus, and epithelial debris served to cause complete urinary obstruction.

2) Ten of the 52 dogs had stones composed either of uric acid or of one of its salts, usually ammonium urate. In a few cases, the stones were coated secondarily with a layer of phosphates. Urate stones in the urethra are usually small, round, and smooth-surfaced, ranging in color from white to yellowish brown. In the bladder, multiple small stones were usually observed, which were yellow or brown. They were friable, somewhat rounded, and had irregular surfaces. Dog 37 had a solitary cystic calculus. This stone was spherical, about 25 cm. in diameter, and yellowish brown with an irregular surface and a porous structure. In the kidney, uric acid stones have a characteristic greenish color, are flattened, and often assume the shape of the renal pelvis.

A calculus is named according to its anatomical location in the urinary tract and the name does not denote the site of the stone's formation, e.g., most urethral calculi are formed in the bladder.

1) Of 23 males with urethral calculi, 16 had cystic stones as well.

2) Of 19 males with cystic calculi, 17 had multiple stones. One exception (dog 37) had a solitary uric acid stone which was associated with multiple pedunculated papillomas arising from the bladder epithelium.

3) Of the 24 females with cystic phosphatic calculi, 22 had multiple pyramidal stones and 2 had solitary ovoid pitted stones.

TABLE 1—Breed Incidence of Canine Urolithiasis

| Breed | No. of cases | Breed | No. of cases |
|------------------|--------------|-------------------------|--------------|
| Cocker Spaniel | 14 | Miniature Schnauzer | 1 |
| Dachshund | 8 | Collie | 1 |
| Dalmatian | 4 | Chihuahua | 1 |
| Irish Terrier | 2 | Wire-Haired Fox Terrier | 1 |
| Beagle | 1 | German Shepherd | 1 |
| Scottish Terrier | 1 | Mixed breed | 16 |
| Boston Terrier | 1 | | |

TABLE 2—Age Incidence of Canine Urolithiasis

| Age | No. of cases | Age | No. of cases |
|----------|--------------|----------|--------------|
| 4 months | 1 | 8 years | 1 |
| 1 year | 2 | 9 years | 2 |
| 2 years | 3 | 10 years | 5 |
| 3 years | 5 | 11 years | 4 |
| 4 years | 8 | 12 years | 0 |
| 5 years | 5 | 13 years | 0 |
| 6 years | 7 | 14 years | 2 |
| 7 years | 7 | | |
| Total | 38 | Total | 14 |

TABLE 3—Location of Calculi Found in Dogs

| Location of calculi by cases | No. of cases | Total calculi in each location | No. |
|------------------------------|--------------|--------------------------------|-----|
| Urethral | 7 | Renal | 5 |
| Urethral, cystic | 14 | Ureteral | 1 |
| cystic | 36 | Cystic | 46 |
| Urethral, cystic, renal | 1 | Urethral | 23 |
| Urethral, cystic, ureteral, | | | |
| renal | 1 | | |
| cystic, renal | 1 | | |
| renal | 2 | | |

DIET

In most cases, the diet of the animals with calculi consisted of standard dog foods and was considered to be well balanced. However, in dogs 4, 5, 37, and 52, a high protein-purine diet over a two- or three-year period was associated with uric acid calculi. In these cases, the diets consisted almost wholly of one or more of the follow-

ing: beef, lamb, beef hearts, livers, and kidneys.

URINARY INFECTION

The method of collecting urine for bacteriological examination is highly important if reliable results are to be obtained. Urine samples collected by catheterization are often contaminated by the multiplicity of microorganisms which normally inhabit the external genitalia of both sexes. In this study, all but three urine samples (dogs 1, 7, and 34) were obtained aseptically by direct aspiration of the urinary bladder following laparotomy and just prior to cystotomy. In dogs 1, 7, and 34, urine was obtained by abdominocentesis after thorough disinfection of the abdominal wall. Two other precautions were taken to ensure accurate results: (1) Urine specimens were taken before antibacterial therapy so that none of the organisms in the urine would be destroyed, and (2) catheterization was avoided before the urine was collected to eliminate the possibility of introducing extraneous organisms into the bladder. Thus, an accurate picture of the bacterial flora in canine urolithiasis was obtained.

MICROORGANISMS FOUND IN URINE

Of 47 urine samples collected for bacteriological examination, 35 were positive and 11 were sterile.

Of 35 positive cultures, 34 were associated with phosphatic calculi and one with uric acid calculi.

Thirty-four of the 39 animals with phosphatic calculi had concomitant urinary infections.

Urease tests were performed on 31 of the 35 positive cultures, and 25 of these cultures were urease-positive. The urine of these animals ranged from a pH of 7.0 to 8.5 (normal urinary pH in the dog is 6.0 to 6.5). The presence of *Proteus* organisms resulted in the most alkaline urines as these bacteria produce large amounts of urease.

In dogs 42 and 46, the soft nuclei of the phosphatic calculi were cultured as well as the urine. In both dogs, the same organisms that were present in the urine were also isolated from the nuclei of the stones.

Micrococci were isolated in 27 of the 35 positive cultures. This group of organisms constitutes the predominate type of infection found in this series of cases. *Micrococcus pyogenes* var. *aureus* and the hemo-

lytic coagulase-positive *M. pyogenes* var. *albus* were almost all urease-positive; whereas only eight of 14 cultures of non-hemolytic coagulase-negative *M. pyogenes* var. *albus* were urease-positive.

Of the 35 infected urines, 24 had pure cultures and 11 had mixed infections. As a rule, these mixed bacterial infections were found in animals that had severe urinary infections for long periods, often a year or more.

Clostridium is a highly pathogenic organism which is rarely associated with urolithiasis. In dog 23, a severe urinary infection was associated with clostridial cystitis and phosphatic cystic calculi. Hematuria was profound, the blood N.P.N. (nonprotein nitrogen) was 145 mg./100 ml. and systemic toxicity was marked. A laparotomy revealed peritonitis, and a necrotizing cystitis with multiple ulcerous hemorrhagic areas, along with a marked friability of the bladder wall. This dog made a remarkable recovery on postoperative penicillin therapy.

Proteus infections always result in severe urinary alkalinization and in 3 of the 4 dogs from which *Proteus* was isolated, it was associated with recurrent urolithiasis.

URINALYSIS CHANGES

In uric acid lithiasis, the most significant findings were a pH of 5.0 to 5.5 and uric acid crystals in the sediment along with a variable number of erythrocytes. The lack of bacterial infection in these cases is the reason why urinary changes are less pronounced than in cases of phosphate lithiasis in which infection is usually present.

In phosphatic lithiasis, a great many urinary changes are noted. The pH varies from 7.0 to 8.5, depending on the urea-splitting properties of the bacteria present. *Proteus* infections consistently produced the most alkaline urine. Urine which is retained over twenty-four hours is always alkaline because of the release of ammonia from the breakdown of urea. The original urinary pH, therefore, can only be determined when there is no urinary retention. The urine often has a strong ammoniacal odor, is turbid and may contain blood, pus, or mucus. The urinary sediment often contains erythrocytes, leukocytes, mucus, triple phosphate crystals,

fibrin, bladder epithelia, cellular debris, or bacteria.

RECURRENTS

Recurrent urolithiasis was observed in 10 animals. In dogs 1, 2, and 3, all of which had uric acid calculi, no prophylactic therapy had been employed postsurgically and thus recurrence was almost a foregone conclusion (table 5).

TABLE 4—Microorganisms Found in the Urine of 35 Dogs Affected with Urinary Calculi

| Organism | No. of cases | No. of cultures urease-positive |
|---|--------------|---------------------------------|
| Hemolytic <i>Micrococcus pyogenes</i> var. <i>aureus</i> | 5 | 4* |
| Hemolytic <i>Micrococcus pyogenes</i> var. <i>albus</i> (coagulase-positive) | 10 | 9 |
| Nonhemolytic <i>Micrococcus pyogenes</i> var. <i>albus</i> (coagulase-negative) | 14 | 8 |
| Hemolytic <i>Streptococcus</i> | 4 | 3 |
| Nonhemolytic <i>Streptococcus</i> | 1 | 0 |
| <i>Proteus</i> sp. | 4 | 4 |
| <i>Paracolon</i> | 2 | 0 |
| <i>Coliform</i> | 7 | 1 |
| Hemolytic <i>Clostridium</i> | 1 | 0 |
| <i>Pseudomonas aeruginosa</i> | 1 | 0 |
| <i>Hemophilus</i> sp. | 2 | 0 |
| Total | 51 | 29 |

*Not done in 1 case.

The urine of 6 of the 7 dogs (table 5) contained urea-splitting bacteria. Bacteriological studies were not performed on the urine of the seventh animal. In 2 dogs, each cystic calculus contained a piece of silk suture material which had sloughed into the lumen of the bladder as a sequel to previous cystotomies and formed a nidus for stone formation.

SYMPTOMATOLOGY

Hematuria.—A hemorrhagic cystitis re-

TABLE 5—Seven Cases of Recurrent Phosphatic Calculi

| Case No. | Urine culture | Urea-splitting ability | Misc. findings |
|----------|---|------------------------|-----------------------------------|
| 8 | <i>M. pyogenes</i> var. <i>albus</i> | + | Silk sutures in nuclei of stones. |
| 10 | <i>Proteus</i> sp. <i>Coliform</i> | + | — |
| 13 | <i>M. pyogenes</i> var. <i>albus</i> | + | — |
| 16 | Not done. | Not done | — |
| 18 | <i>M. pyogenes</i> var. <i>albus</i> | + | — |
| 26 | <i>Proteus</i> sp. | + | Silk sutures in nuclei of stones. |
| 36 | <i>Proteus</i> sp. <i>Coliform</i> <i>M. pyogenes</i> var. <i>albus</i> | + | — |

sults from the irritation set up by the calculi and by the coexistent bacterial infection. The amount of blood in the urine varies with the roughness of the stone's surface, the duration of the urinary retention, and the type of the infection present. In most cases, the amount of extravasation is not great; however, in dog 23 severe hematuria resulted from a clostridial cystitis.

Passage of Clear Urine Followed by Drops of Blood.—This results from trauma inflicted on the epithelial surfaces by the calculi as the animal strains to urinate.

Dysuria.—Mechanical obstruction to the urinary outflow, plus the hypertonicity of the smooth muscle around the offending stone, results in prolonged labored attempts at micturition. In many cases, severe pain is also noted in the dysuric animal.

Increased Frequency of Urination.—The cystitis and urethritis present causes irritation and the animal has a constant urge to void. This may result in dribbling of urine and even in urinary incontinence.

Pungent Ammoniacal Urine.—The strong odor of the urine is often an early sign of urinary infection and concomitant urea breakdown with the liberation of ammonia. This alkaline urine is associated with phosphate calculi and the pH may be as high as 8.5. If the cystitis is associated with severe tissue necrosis, the urine will have a putrid odor.

Pyuria.—The urine may be loaded with leukocytes, fibrin, mucin, albumin, and epithelial debris.

Calculi in the Urine.—An affected bitch may pass fairly large concretions, and either sex may pass large amounts of sabulous material which can be detected by straining the urine through several layers of fine gauze.

Calculus Anuria.—This is the most serious sign and death is usually due to uremia (manifested early by depression, anorexia, congested mucosae, and emesis and, later, by oral and glossal ulcers, and cold, clammy, pale mucous membranes) with or without rupture of the distended urinary bladder and peritonitis.

The foregoing signs are associated with lower urinary tract obstructions. In only 1 of the 5 dogs affected with neoholithiasis were there any signs suggesting renal calculi. This bitch (dog 15) had hematuria and severe lumbar pain associated with

emesis, anorexia, and severe depression leading to coma and death. Urinalysis revealed a red-opaque alkaline urine containing albumin, a few erythrocytes, many leukocytes, and a small amount of mucus. The blood N.P.N. was 320 mg./100 ml. Radiographs revealed a large calculus in each renal pelvis. At autopsy, each calculus was found to be surrounded by a slimy gelatinous material and a thin rim of kidney tissue. In this case, the severe destruction of renal parenchyma by the enlarging calculi resulted in renal insufficiency and death. This was the only dog in which death was attributable to renal calculi.

In canine urolithiasis, the clinician is mainly concerned with obstructions of the lower urinary tract. Many cases of chronic cystitis and urethritis fail to respond permanently to medical treatment because of the unsuspected coexistence of urinary calculi. The presence of urinary lithiasis should always be suspected in any animal exhibiting one or more of the previously mentioned signs.

DIAGNOSIS

Clinical Examination.—*Palpation.*—If the animal is obese, the abdomen tense, the bladder full of urine or contracted caudal to the pubic brim, palpation is of little value. Fecaliths, intestinal foreign bodies, enlarged prostate glands, and retained testicular tumors may be mistaken for cystic calculi. However, in many cases palpation readily reveals the presence of vesical calculi.

Catheterization.—Grating is heard or felt as the catheter passes the stone(s). Complete resistance to passage of the catheter is most common at the caudal end of the penile bone, the narrowest part of the extrapelvic uretha. In the bitch, the catheter may strike the stones in the bladder and give off a metallic sound.

Radiological Examination.—This is a reliable diagnostic tool. Fluoroscopy in many cases is unsatisfactory and often misleading and radiographic study is far superior.

The radiopacity of a stone varies with its content of calcium and phosphorus and good technique is necessary to see small calculi, especially pure uric acid stones which are the least radiopaque of all urinary calculi.

A lateral projection is satisfactory for visualization of the bladder and urethra

while both lateral and anteroposterior views are used to outline renal stones.

In questionable cases, the injection of air into the bladder (pneumocystogram) will clearly outline small, less radiopaque, cystic calculi as well as revealing the mucosal pattern. The same thing can be accomplished by injecting a radiopaque fluid (lipiodol) into the bladder.

Intravenous urography, utilizing diodrast, is valuable in delineating calculi in pelvico-caliceal portions of the kidney and in the ureters. It should be stated that the ureteral calculus, a common cause of renal colic in man, is distinctly uncommon in the dog.

TREATMENT

In the male, urolithiasis presents an acute, often fatal, syndrome which usually requires prompt surgical intervention. It is important to check for cystic calculi before performing a urethrotomy as the condition will soon recur when one or more of the cystic calculi descend to occlude the urethral lumen. In cases of recurrent urethral lithiasis, it is often advantageous to create a permanent urethral fistula just caudal to the penile bone. This location avoids the scalding and dermatitis resulting from urine contacting the skin of the perineum, buttocks, and scrotum. In this procedure, the urethral mucosa is sutured to the surrounding skin edges. This fistula will allow urethral stones to pass through to the outside before they reach the os penis and occlude the lumen. This operation should also be combined with adequate medical prophylaxis.

In the bitch, the disease is chronic and calculous anuria is rarely observed. Surgery in these cases is usually elective and should only be performed after careful evaluation of the patient. Atraumatic catgut is used for closure of the cystotomy wound, as 2 recurrent cases were observed in which silk suture material formed a nidus for a total of seven stones.

PROPHYLACTIC THERAPY

The importance of a rational prophylactic program in the postoperative period can not be over-emphasized. The client must be informed of the recurrent nature of urolithiasis and of the value of medical therapy in preventing further attacks.

Phosphatic Calculi Prophylaxis.—These

calculi are known as secondary stones as they are often associated with urinary infection. Phosphate crystals are soluble in acid urine and precipitate in alkaline urine. The following measures are indicated:

Elimination of Urinary Infection.—(a) Aseptic surgical procedures and catheterizations are used — dirty catheters readily carry bacteria into the bladder; (b) eradication of all foci of sepsis, i.e., infected tonsils, teeth, prostate gland, anal glands, ears, etc.; (c) urine culture along with *in vitro* sensitivity tests to determine the most effective antibiotic; (d) systemic use of the specific antibiotic for a five- to seven-day period; (e) a negative urine culture two or more weeks after antibiotic therapy is the best evidence of effective medication.

Urinary Acidification.—(a) Acidifying drugs such as sodium acid phosphate and ammonium chloride can be used. Enteric-coated ammonium chloride (0.5 gr./lb. daily in divided doses) is preferable as it is a better acidifier and it does not increase the renal excretion of phosphates as does the sodium acid phosphate. The acidifying action is due to the liberation of the acid chloride radical in the urine.

(b) Infection by urea-splitting microorganisms should be eliminated. This bacterial action on urea produces ammonium hydroxide which offsets the acidifying action of the chloride radical, and the urine remains alkaline.

(c) An acid-ash diet consisting of eggs, especially egg whites, bread, corn, oatmeal, lean pork or beef, and chicken is recommended. Persistent urinary acidification results in a loss of calcium, and rennet cheese can be fed several times a week to compensate for this loss. Since this diet is also low in vitamin C, it is advisable to supplement it with 50 mg. of vitamin C every other day.

Decreased Renal Excretion of Phosphates.—(a) Alumina carbonate gel binds phosphorus in the digestive tract, lowers the serum inorganic phosphorus, and thus reduces the renal excretion of phosphates. It is used for recurrent phosphatic renal calculi in man. The drug is safe over long periods and the only apparent side-effect is an occasional mild constipative effect.

(b) A low mineral diet is helpful. Avoid feeding milk, whole wheat, or foods containing fish meal or bone meal.

TABLE 6—Tabulated Summary of 52 Cases of Canine Urolithiasis

| Case No. | Breed | Sex | Age | Calculus | Composition | Urine culture | Urea-splitting ability |
|----------|------------------------|-----|--------|-------------------------------------|------------------------------------|---|------------------------|
| 1 | Dalmatian | M | 4 yr. | Urethral (multiple) | Uric acid | Negative | — |
| 2 | Dalmatian | M | 3 yr. | Urethral (multiple) | Uric acid (phosphate trace) | Negative | — |
| 3 | Dalmatian | M | 6 yr. | Entire tract involved | Uric acid (phosphate trace) | Negative | — |
| 4 | Mixed | M | 3 yr. | Urethral (multiple) | Uric acid | Negative | — |
| 5 | Irish Terrier | M | 4 yr. | Urethral (multiple) | Uric acid | <i>Micrococcus pyogenes</i> var. <i>albus</i> ** | + |
| 6 | Chihuahua | M | 2 yr. | Urethral (multiple) | Uric acid | Not done | — |
| 7 | Dachshund | M | 3 yr. | Urethral (multiple) | Triple phosphate | Negative | — |
| 8 | Dachshund | F | 5 yr. | Cystic (multiple) | Triple phosphate (silk suture) | <i>M. pyogenes</i> var. <i>albus</i> * | + |
| 9 | Dachshund | F | 7 yr. | Cystic (multiple) | Triple phosphate | Coliform | Not done |
| 10 | Dachshund | M | 2 yr. | Cystic urethral renal (multiple) | Calcium phosphate | Proteus sp. | + |
| | | | | | | Coliform | |
| 11 | Dachshund | F | 4 yr. | Cystic (multiple) | Triple phosphate | <i>M. pyogenes</i> var. <i>albus</i> * | Not done |
| 12 | Dachshund | F | 10 yr. | Cystic (multiple) | Triple phosphate | <i>M. pyogenes</i> var. <i>aureus</i> ** | Not done |
| 13 | Cocker Spaniel | M | 5 yr. | Cystic urethral (multiple) | Triple phosphate | Not done | — |
| 14 | Cocker Spaniel | M | 4 yr. | Cystic urethral (multiple) | Calcium phosphate | <i>M. pyogenes</i> var. <i>albus</i> * | + |
| 15 | Cocker Spaniel | F | 11 yr. | Renal (bilateral) | Triple phosphate | Coliform | Not done |
| 16 | Cocker Spaniel | M | 1 yr. | Cystic urethral (multiple) | Calcium phosphate | <i>M. pyogenes</i> var. <i>albus</i> ** | — |
| 17 | Cocker Spaniel | M | 2 yr. | Cystic urethral (multiple) | Triple phosphate | Not done | — |
| 18 | Cocker Spaniel | F | 6 yr. | Cystic (multiple) | Triple phosphate | <i>M. pyogenes</i> var. <i>albus</i> * | + |
| 19 | Cocker Spaniel | F | 7 yr. | Cystic (multiple) | Calcium phosphate | <i>M. pyogenes</i> var. <i>aureus</i> ** | + |
| 20 | Cocker Spaniel | F | 4 yr. | Cystic (multiple) | Triple phosphate | <i>M. pyogenes</i> var. <i>albus</i> * | + |
| | Setter cross | | | | | Coliform | |
| 21 | German Shepherd | M | 4 yr. | Cystic urethral (multiple) | Triple phosphate | <i>M. pyogenes</i> var. <i>albus</i> * | — |
| 22 | Setter | M | 10 yr. | Cystic urethral (multiple) | Triple phosphate | Paracolon | + |
| 23 | Miniature Schnauzer | F | 6 yr. | Cystic (multiple) | Calcium phosphate | Hemolytic Clostridium | — |
| 24 | Scotch Terrier | F | 4 yr. | Cystic (solitary) | Triple phosphate | <i>M. pyogenes</i> var. <i>albus</i> ** | — |
| 25 | Boston Terrier | F | 6 yr. | Cystic (multiple) | Triple phosphate | <i>M. pyogenes</i> var. <i>aureus</i> ** | + |
| 26 | Terrier | F | 6 yr. | Cystic (multiple) | Triple phosphate (silk sutures) | <i>M. pyogenes</i> var. <i>aureus</i> ** | + |
| 27 | Mixed | F | 8 yr. | Cystic (multiple) | Triple phosphate | Proteus sp. | — |
| 28 | Mixed | F | 5 yr. | Cystic (multiple) | Triple phosphate | <i>M. pyogenes</i> var. <i>albus</i> * | — |
| 29 | Mixed | F | 10 yr. | Cystic (solitary) | Triple phosphate | <i>M. pyogenes</i> var. <i>albus</i> ** | — |
| 30 | Mixed | M | 14 yr. | Cystic urethral (multiple) | Triple phosphate | Negative | — |
| 31 | Mixed | M | 9 yr. | Cystic urethral (multiple) | Triple phosphate | Paracolon | Not done |
| 32 | Mixed | F | 10 yr. | Cystic (multiple) | Triple phosphate | <i>M. pyogenes</i> var. <i>albus</i> * | — |
| 33 | Mixed | F | 7 yr. | Cystic (multiple) | Triple phosphate | <i>M. pyogenes</i> var. <i>albus</i> ** | + |
| 34 | Mixed | M | 3 yr. | Urethral (multiple) | Triple phosphate | <i>M. pyogenes</i> var. <i>albus</i> ** | + |
| 35 | Mixed | F | 5 yr. | Cystic (multiple) | Calcium phosphate | Nonhemolytic Streptococcus | — |
| 36 | Beagle | M | 2 yr. | Cystic urethral (multiple) | Triple phosphate | <i>M. pyogenes</i> var. <i>albus</i> ** | + |
| | | | | | | <i>M. pyogenes</i> var. <i>albus</i> * | — |
| 37 | Dachshund | M | 5 yr. | Cystic (solitary) | Uric acid | <i>M. pyogenes</i> var. <i>albus</i> ** | + |
| 38 | Mixed (Cocker Spaniel) | F | 9 yr. | Cystic (multiple) | Triple phosphate | Negative | — |
| 39 | Dalmatian | M | 11 yr. | Renal (bilateral multiple) | (carbonate) | <i>M. pyogenes</i> var. <i>albus</i> ** | — |
| 40 | Cocker Spaniel | F | 7 yr. | Cystic (multiple) | Uric acid | Hemolytic Streptococcus? | + |
| 41 | Mixed (Cocker Spaniel) | M | 11 yr. | Cystic urethral (multiple) | Triple phosphate (fibrin) | <i>Escherichia coli</i> † | — |
| 42 | Cocker Spaniel | F | 6 yr. | Cystic (multiple) | Triple phosphate | Proteus sp.‡ | — |
| 43 | Irish Terrier | M | 10 yr. | Renal cystic | Triple phosphate | Negative | — |
| 44 | Cocker Spaniel† | M | 4 mo. | Cystic urethral (multiple) | Triple phosphate | Hemolytic Streptococcus | + |
| 45 | Mixed (Terrier) | F | 14 yr. | Cystic (multiple) | Triple phosphate | Hemolytic Streptococcus | — |
| 46 | Wire-Haired Terrier | F | 7 yr. | Cystic (multiple) | Triple phosphate | <i>Hemophilus</i> sp. | + |
| | | | | | | <i>M. pyogenes</i> var. <i>albus</i> ** | — |
| | | | | | | <i>M. pyogenes</i> var. <i>albus</i> ** | + |

** — †

TABLE 6 (Continued)—Tabulated Summary of 52 Cases of Canine Urolithiasis

| Case No. | Breed | Sex | Age | Calculus | Composition | Urine culture | Urea-splitting ability |
|----------|----------------|-----|--------|----------------------------|------------------|---|------------------------|
| 47 | Cocker Spaniel | F | 7½ yr. | Cystic (multiple) | Triple phosphate | Hemophilus sp. Hemolytic Streptococcus <i>M. pyogenes</i> var. <i>albus</i> * | + |
| 48 | Collie | M | 3 yr. | Cystic urethral (multiple) | Triple phosphate | <i>M. pyogenes</i> var. <i>albus</i> * | + |
| 49 | Mixed | M | 11 yr. | Cystic urethral (multiple) | Triple phosphate | Negative | - |
| 50 | Cocker Spaniel | M | 6 yr. | Cystic urethral (multiple) | Triple phosphate | Pseudomonas Aeruginosa | - |
| 51 | Cocker Spaniel | F | 7 yr. | Cystic (multiple) | Triple phosphate | <i>M. pyogenes</i> var. <i>albus</i> ** | + |
| 52 | Dachshund | M | 4 yr. | Cystic (solitary) | Uric acid | Negative | - |

*Nonhemolytic, coagulase-negative; **hemolytic, coagulase-positive; †same organism isolated from center of calculus.

*Previously reported by Brodkey, R. S.: Urolithiasis in a Four-Month-Old Cocker Spaniel. *North Am. Vet.*, 35, (1954): 530.

Uric Acid Calculi Prophylaxis.—These calculi are known as primary stones and are not associated with urinary tract infection. Uric acid crystals are soluble in alkaline urine but precipitate in acid urine.

The following measures are indicated:

Urinary Alkalization.—Sodium bicarbonate can be used over long periods without harmful effects. A fairly high dosage (1 gr./lb. daily in divided doses) is required to alkalinize the urine and this action can readily be determined by the use of litmus paper.

An alkaline-ash diet, consisting mostly of vegetables and fruits, should be fed.

Reduced Renal Excretion of Uric Acid.—A low protein-purine diet should be fed in all cases. Foods containing many nucleic, such as liver, kidneys, and heart, should be eliminated from the diet, and feeding of muscle meats should be greatly reduced.

Urolithiasis Prophylaxis.—The following measures are indicated in all cases of urolithiasis:

Vitamin A Administration.—Vitamin A was used prophylactically, as it is known that this fat-soluble vitamin prevents keratinizing metaplasia of the urinary epithelium and maintains an epithelium which is resistant to infection. However, it has not been shown that people affected with calculi are deficient in vitamin A. A total of 25,000 units of vitamin A was given daily for one week and then 5,000 units two or three times a week from then on.

High Fluid Intake.—The maintenance of a high fluid intake is an important prophylactic measure. Fresh water should always be available to the animal, as a highly concentrated urine is a favorable medium for calculus formation.

Avoid Urinary Stasis.—Measures should be taken to avoid urinary stasis. Animals

should be allowed outdoors to urinate often, as stasis of urine favors infection and sedimentation of urinary crystals with possible urinary lithiasis. If prostatic disease is causing retention of urine, it should be appropriately treated.

Smooth Muscle Relaxants.—Smooth muscle relaxants should be used when indicated. They have a limited use in relieving spasticity around a calculus and at times may aid the animal in successfully passing a urolith.

DISCUSSION

Phosphate Lithiasis.—From the data collected on the 42 cases of phosphate urolithiasis, urinary tract infection appears to be of prime etiological importance. Thirty-four (89%) of the urine cultures in 39 cases were positive. Twenty-four (70%) of these 34 positive cultures contained urea-splitting bacteria. In dogs 42 and 46, the isolation of the identical bacteria in the nucleus of the calculus, and in the urine, also strongly suggest the etiological role of infection. Culture of the nucleus of the calculus was only performed in these 2 animals and further investigation of this type will be carried out in the future. In the 4 dogs exhibiting negative urine cultures, it is possible that the body defensive mechanisms (*i.e.*, inflammation) succeeded in eradicating the infection after urolithiasis occurred, or that presurgical antibacterial treatment prescribed by the referring practitioner sterilized the urine.

Some house pets become obese and sluggish and are often forced to retain urine over extended periods. Fett and Kane¹ observed the high incidence of renal calculi associated with prolonged decubitus in a group of human fracture patients. The poor drainage and subsequent stasis of urine in dependent portions of the caliceal-

pelvic system of the kidney was considered responsible for sedimentation of urinary salts and debris with eventual renal lithiasis. In the dog, prolonged retention of urine causes abnormal bladder distention and, therefore, a partial loss of contractile power. This hypotonic bladder may not completely empty itself at each micturition and urinary stasis and sedimentation can thus occur. Stasis is also important in aiding the establishment of urinary infection as bacteria flourish in a stagnant medium. The multitude of microorganisms in the preputial cavity and anterior penile urethra of the male may invade up the long narrow male urethra or the many bacteria on the vulva or vaginal mucosa may invade down the short wide female urethra. It appears that the anatomy of the female urogenital tract would allow for easier access of infection into the urinary bladder. Twenty-two (63%) of the 35 urinary infections occurred in females. In severe long-standing cystitis, mucosal destruction may be followed by smooth muscle damage with subsequent replacement fibrosis. Thus, the normal highly elastic muscular bladder wall is gradually converted to a rigid inelastic fibrous sac, whose emptying power is minimal. Urinary incontinence may result from sphincter destruction or overflow of urine from the inelastic bladder which can not expand properly. The urine is turbid, has an ammoniacal or pungent odor, and may contain blood, pus, or mucus. Cases of severe chronic cystitis have been seen in which calcification of the bladder mucosa was evident clinically, radiologically, and at surgery.

Uric Acid Lithiasis.—The 10 dogs studied appeared to fall into four main categories: (1) Four cases were observed in purebred Dalmatians. These animals lack the enzyme, uricase, which converts uric acid, a relatively insoluble substance, into allantoin, a relatively soluble substance. Therefore, the end product of purine catabolism in the Dalmatian is uric acid instead of allantoin. Because of this metabolic difference, this breed is definitely predisposed to uric acid lithiasis. However, the reason for stone formation in certain Dalmatians and not in others is not at all clear.

2) This group consists of dogs 4, 5, 37, and 52. Each of these 4 animals (not Dalmatians) had been fed an almost 100 per cent protein-purine diet for a one- to three-

year period. It appears that these cases were of strictly dietary etiology as the exogenous uric acid production was greatly increased over a long period. In these animals, alteration of the diet to a standard canine ration was the main prophylactic step and there have been no recurrences in a two-year period.

3) In dog 43, renal and cystic uric acid calculi were associated with chronic lymphatic leukemia. This dog exhibited none of the typical clinical signs of lymphosarcoma and the leukemia was detected during a routine blood examination. The highest total leukocyte count was 188,000 with 48 per cent lymphoid cells, 37 per cent of which were lymphocytes and 11 per cent were prolymphocytes. Over 20 hemograms were studied in this case and a diagnosis of chronic lymphatic leukemia was made. The right kidney was atrophic, containing two yellowish flattened stones with irregular borders and there was compensatory hypertrophy of the left kidney. A right nephrectomy and a cystotomy were performed. No other visceral pathological alterations were noticed. Cultures from the renal pelvis were negative. The animal recovered from the surgery but several months later its condition deteriorated; however, necropsy was not performed. The tremendous breakdown of nuclear material in leukemia causes a great increase in endogenous uric acid production. At a time when the total leukocyte count was 140,000 and the blood N.P.N., was 37.0 mg./100 ml., the blood uric acid was 1.65 mg./100 ml. (normal is 0.0 to 0.05 mg./100 ml.). This animal, while it had only one functioning kidney, appeared to have over the 33 per cent of healthy renal tissue necessary to prevent renal insufficiency. The N.P.N. of 37 mg./100 ml. and others that ranged as high as this 72 mg./100 ml. were probably the result of a greatly increased nitrogen catabolism due to generalized tissue breakdown and leukemic cellular destruction. At a time when the total leukocyte count was 82,000, 76 per cent of which were lymphocytes, there was 22.4 mg. of uric acid per 100 ml. of urine. In a normal control animal, there was 10.5 mg. of uric acid per 100 ml. of urine. In this case, the formation of uric acid calculi appeared to be secondary to a chronic lymphatic leukemia.

4) In this animal (dog 6), no conclusions could be made. No information concerning

the diet in this case was obtained. Some authors² think that hepatic dysfunction may be a factor in urolithiasis, as the formation of uricase by the liver is decreased and excess amounts of uric acid are excreted by the kidney, thus upsetting the colloid-crystalloid balance in the urine.

SUMMARY

Observations on 52 cases of canine urolithiasis have been described and discussed. The prime importance of urinary infection in phosphate urolithiasis is stressed. Urine culture, along with *in vitro* tests to determine the antibiotic sensitivity of the organisms isolated, is the most important part of the postoperative prophylactic therapy.

In uric acid lithiasis, many factors are still imperfectly understood. However, dietary changes, urinary alkalinization, and high fluid intake are essential points in preventive treatment.

It is imperative not only to treat an animal affected with urinary calculi but also to establish a sound program of preventive therapy in the postsurgical period.

References

¹Fett, H. C., and Kane, J. T.: Urinary Calculi in Recumbent Fracture Patients. *Am. J. Surg.*, 71, (1946): 441.

²Ungar, M. D., and Ungar, R.: Studies on the Pathogenesis of Urate Calculi in Urinary Tract of White Rats. *Am. J. Path.*, 28, (1952): 291.

Fluoridation in Britain.—Four communities in the British Isles have ordered from the United States the apparatus with which to add fluoride at the rate of 1 p.p.m. to the public water supplies. This is the result of a study made in North America in 1952.—*Brit. M. J.*, Sept. 11, 1954.

Pleuropneumonia-like Organisms

The organisms of bovine contagious pleuropneumonia, ovine and caprine contagious agalactia, and the pleuropneumonia-like organisms constitute a uniform class. Some grow on ordinary medium but most require an additional factor. They are killed by disinfectants and by streptomycin and aureomycin[®] but not by sulfonamides and penicillin. Those known to cause animal diseases show an interesting mechanism of infection. Although the disease produced

may be devastating and lethal, exposed animals are not readily infected. However, infection often occurs in animals exposed to stress, the infection becoming manifest when resistance of the animal is lowered. The second factor may be fatigue, parturition, and lactation, as in sheep and goats, or a second infective agent which may or may not in itself be pathogenic. This group of organisms may be regarded as forms intermediate between viruses and bacteria.—*Vet. Bull.*, Oct., 1954.

A European Foot-and-Mouth Disease Commission

The European Commission for the Control of Foot-and-Mouth Disease, which was established in June, 1954, when Denmark, Ireland, the Netherlands, Norway, the United Kingdom, and Yugoslavia accepted its constitution, held its first meeting in the headquarters of the F.A.O. in Rome in July, 1954. Its function is to assist countries in planning effective action against this disease. It is hoped that other countries will soon join the Commission.—*F.A.O. Memo*, Aug., 1954.

Shipping Fever in Canada

When 26 of a group of 4- to 12-month-old calves which had just been shipped to Ontario from western Canada died of shipping fever, fresh tissues secured at necropsy were bacteriologically examined. From the lungs, *Pasteurella hemolytica* was recovered in pure culture in 13 animals and combined with *Corynebacterium pyogenes* in 2, while *Pasteurella multocida* was isolated in pure culture from 7 and combined with a pleuropneumonia-like organism in 3. The latter organism was recovered in pure culture in 1 animal. All of the spleens cultured and all of the livers (except 4) were negative. When 6 normal calves from 1 to 5 months old were inoculated by various routes, 1 with blood from a sick animal and 5 with a suspension from morbid lung material, all remained normal. One calf was inoculated directly into the lungs through the thoracic wall.—*Canad. J. Comp. Med.*, Oct., 1954.

In 1953, 33 human cases of anthrax were reported in the U. S., all of industrial origin.—*Pub. Health Rep.*, June, 1954.

Recruitment and Training of Veterinary Research Pathologists

WILLIAM H. FELDMAN, D.V.M.

Rochester, Minnesota

IN JANUARY, 1954, at Bethesda, Md., the Pathology Study Section of the Division of Research Grants of the National Institutes of Health, U.S. Public Health Service, conducted a symposium entitled, "Increasing the Research Potential in Pathology." The agenda engaged the attention of the conference for two days. The character of the program was predicated on (1) the existence of a serious shortage of research pathologists; (2) the significance of this deficiency to the future advancement of the medical sciences; (3) an analysis of the basic factors responsible for the shortage of competent, well-trained research pathologists; and (4) the exploration of ways and means to correct the deficiency.

Based on information presented during the symposium, a series of recommendations was prepared by those representing the different facets of the problem and an *ad hoc* committee was appointed to provide implementation of the recommendations.*

Among the items on the agenda that were discussed at some length were the following: recruitment of pathologists for research; research training in pathology; training in neuropathology; training of veterinary research pathologists; training for the degree of Doctor of Science or Doctor of Philosophy in experimental pathology; post-training career of research pathologists; and, finally, financial support.

The material presented at the conference served as source material from which were formulated specific recommendations. These, if carried out, should eventually contribute effectively to increasing the research potential of pathology, particularly as this discipline pertains to the diseases of human beings.

The symposium recognized that veterinary medicine and dentistry are important allies of human medicine in the search for new and useful information. Recommendations directed to the improvement of train-

ing and facilities for research pathology in allied professions were as follows: (a) that departments of pathology of schools of veterinary medicine, schools of dentistry, and schools of medicine establish graduate courses in comparative pathology, and (b) that these schools provide adequate facilities and training to encourage students holding doctorate degrees in their respective professions to participate in experimental research and to secure training for the degree of doctor of philosophy in pathology.

It was the opinion of the Committee on Recommendations that the complete report and recommendations of the Committee on Training in Veterinary Pathology were of sufficient value to justify their being made available to the veterinary profession by publication in the official JOURNAL of the American Veterinary Medical Association. The report pertaining specifically to training in veterinary pathology was prepared by Willard H. Eyestone, D.V.M., National Institutes of Health; F. K. Mostofi, M.D., Armed Forces Institute of Pathology; and William H. Feldman, D.V.M., Mayo Foundation, chairman. The report follows:

A) INTRODUCTION

Veterinary research pathology has been responsible for many significant contributions to the basic understanding of both animal and human diseases. The lower animals are a potent source of bacterial, viral, rickettsial, protozoal, fungal, and parasitic diseases many of which are capable of being transmitted to man. This situation emphasizes the importance of, and the necessity for, veterinary and medical research pathologists to combine their efforts in controlling these threats to human and to animal health.

Significant contributions of veterinary research pathology have included (1) the discovery that an infectious agent can be transmitted from animal to animal by an insect serving as an intermediate host; (2) the discovery that hog cholera is due to a virus and the subsequent development of a successful method of immunization against this economically important disease; (3) pertinent information relating equine encephalomyelitis to certain types of encephalitis in man; and (4) the development of knowledge concerning the patho-

From the Section of Pathologic Anatomy, Mayo Clinic, Rochester, Minn.

*The complete symposium was published in *Laboratory Investigation*, 3, (Sept.-Oct., 1954): 379-450.

genesis, transmission, and control of bovine tuberculosis, brucellosis, sylvatic plague, ornithosis, and many other human and animal diseases.

Veterinary research pathology has a continuing responsibility to protect the nation's food supply and to insure an effective attack on the diseases of animals transmissible to man. The well-trained specialist in this field will find an endless number of problems both intellectually exciting and important. The scope of the medical sciences is ever expanding and, as the periphery is extended, new clues for the solution of old problems and new leads suggesting additional problems constantly occur. For the investigator with imagination and resourcefulness, no problem in research pathology is ever solved with finality. This is especially true in veterinary pathology, concerned as it is with a large number of different animal species—mammals and fowl, domesticated and wild—affected with diseases naturally acquired or experimentally induced. This complexity of biological factors which confronts the veterinary pathologist also confronts the medical pathologist, the microbiologist, the pharmacologist, and the physiologist as they use animals in experimental procedures. It is obvious that in such experiments a well-trained veterinary pathologist is an essential collaborator. This area of usefulness is being recognized increasingly but, unfortunately, its maximal realization is limited by the present scarcity of qualified individuals.

The present status of training in veterinary pathology, teaching, and research, as revealed by our incomplete information, may be summarized as follows:

B) SUBJECT MATTER

1) *Schools of Veterinary Medicine.*—At the present time (Jan., 1954), there are 17 schools of veterinary medicine in the United States. Ten have unqualified approval by the Council on Education of the AVMA; six are on probation. This program of undergraduate training seems adequate for present needs.

a) Enrollment and Graduate Potential.—The total enrollment for the academic year 1953-1954 is 3,537; 89% are first-year students selected from 2,634 applicants. Under existing teaching facilities, this appears to be the maximum number of first-year students that can properly be accepted in any one year.

b) Matriculation Requirements. A minimum of two years preprofessional training in a recognized college or university is required for matriculation in a school of veterinary medicine.

2) *Professional Activities After Graduation.*—The professional pursuits of graduate veterinarians, as of 1953, may be classified as follows: general practice, 60 per cent; federal and state disease control, 15 per cent; Armed Forces, 4 per cent; teaching and research, 4 per cent; commercial pursuits, 2 per cent; inactive, retired, and others, 15 per cent.

3) *Graduate Training.*—(a) Utilization of Existing Facilities.—At the present time, graduate training in various specialties in veterinary medicine is offered in a majority of the veterinary colleges. Presently, the ratio of graduate students to undergraduates is 1 to 23. The number of institutions offering acceptable programs for the training of veterinary pathologists is limited. Acceptable training is available in a few departments of veterinary science (not veterinary colleges) where schools of medicine are located on the same campus. Although excellent training may be had in several institutions, additional facilities are needed. No precise information is available as to the number of graduate students training for a career in teaching or research pathology, but it is our opinion that the number is pitifully small.

By providing fellowships, the Research Council of the American Veterinary Medical Association has made a commendable attempt to fill the void in graduate training. Unfortunately, relatively few candidates accepted by the Council have chosen a career in pathology.

4) *Availability of Competent Veterinary Pathologists.*—A critical shortage of competent specialists in this field exists in both teaching and research. This situation is due to the excessive demands during the past few years for specialists in veterinary pathology for teaching and for research. The factors responsible for the increased demands have been (a) the establishment during the past ten years of seven new schools which at present account for approximately 30 per cent of the total enrollment in the 17 schools, and (b) the increased demands of industry and research institutions.

5) *Educational Shortcomings.*—Although excellent undergraduate training is offered in several of the existing veterinary schools, it is apparent that improvement in this phase of training is possible and needed. Particularly disturbing is the shortage on some of the teaching staffs of inspiring, well-trained men capable of indoctrinating the student at a graduate level in the need for and accomplishments of research pathologists. Scholarship is not the only prerequisite for the successful teacher. The assistance of the Council on Education of the American Veterinary Medical Association should be solicited to ascertain (1) the departments of veterinary pathology that may be substandard, and (2) the institutions which have the facilities to train research pathologists adequately.

6) *Factors Affecting Training.*—The common factor which deters promising young men from choosing a career in research pathology is financial resources. This factor is particularly significant due to: (a) the long period required for the preprofessional and professional courses of study at the undergraduate and graduate level; (b) immediate family responsibilities; (c) concern for future security and livelihood for themselves and their dependents; and (d) the availability at the present time of employment immediately after

completion of undergraduate training with assurance of substantial incomes from practice or commercial pursuits.

7) *Recruitment.*—The following suggestions are offered concerning the recruitment of veterinary research pathologists: (a) Make the graduate course offerings more attractive intellectually; (b) recognize potential talent in the undergraduate students; (c) cultivate interest in, and enthusiasm for, research; and (d) explore the possibilities for financial support by governmental agencies, privately endowed institutions, and individuals interested in the furtherance of medical research.

8) *Finances.*—Most of the present fellowship grants are totally inadequate and frequently insufficient to provide a respectable subsistence.

The present economic situation is such that the graduate student in a professional specialty should receive an income sufficient for him and his family to live with respect and dignity. Probably a stipend of two or three times what he is ordinarily offered at present would be too great.

C) RECOMMENDATIONS AND IMPLEMENTATION

1) Raise quality of academic training in both undergraduate and graduate years.

2) Solicit the support of those groups and individuals in the best position to assist in recruitment. These include: (a) the teachers of pathology at the undergraduate level; (b) the Research Council of the American Veterinary Medical Association; (c) the Council on Education of the American Veterinary Medical Association; and (d) the American College of Veterinary Pathologists.

3) Provide for teachers in pathology, salaries and professorial recognition and advancement commensurate with the importance of their responsibilities and contributions in the over-all realm of medical science.

4) Institute a program directed at the securing of adequate funds for the training of graduate students in this specialty.

5) Request the Council on Education and the Research Council of the American Veterinary Medical Association to assist in advising prospective candidates for research fellowships as to where the most effective training is available.

6) Set up a system of traveling lectureships whereby eminent career pathologists can tell the story of research to undergraduate students in veterinary medicine in the hope that interest in this specialty may be stimulated. This would be a worthy project for the various state and national veterinary organizations. Also worthy of exploration is the possibility of obtaining funds from individuals and from certain industries to support lectureships of this kind.

7) Subject the questions pertaining to veterinary pathology raised in this symposium to a definitive study by a larger group with adequate time to provide more factual information. This we consider urgent and vital.

8) Inform the Council on Education and the Research Council, respectively, of the American Veterinary Medical Association and the American College of Veterinary Pathologists of the serious shortage of well-trained career pathologists for teaching and research and supply each of the previously mentioned groups with copies of this report.

CONCLUSION

The foregoing report, while pointing out certain educational shortcomings in the training of veterinary pathologists, is not in any sense intended to be critical of the Council on Education of the American Veterinary Medical Association. The Council has rendered commendable service to the betterment of educational standards for veterinarians over a long period. The large number of competent graduates who enter the profession yearly is an impressive tribute to the valiant and constructive watchfulness and to the wisdom of the Council.

It is generally recognized that the training for any medical specialty, while definitely dependent on the over-all academic preparation, requires, in addition, special attention to facilities, to curriculum, and to faculty leadership and enthusiasm. It is in these areas, that means should be found to improve the quality of graduate training in veterinary specialties in the veterinary schools of America. It may not be within the jurisdiction of the Council on Education to assume official responsibility in the area of graduate training in veterinary schools. Nevertheless, the problem must be met if veterinary medicine, in the broadest connotations of the term, is to meet successfully the ever-increasing demands for more effective control of animal diseases and, in addition, to contribute significantly to the allied medical sciences.

Therefore, it would seem imperative that the many and complex questions regarding graduate training of veterinarians who elect to prepare for a career in one of the specialties be given serious consideration by those concerned with matters pertaining to professional educational standards. As was recommended in the "Report of the Committee on Training in Veterinary Pathology" certain official groups within the profession might properly explore this problem as it is related to the graduate training of veterinary pathologists. This could be done by each group separately or, preferably, by functioning in close cooperation with the others.

During the past two decades, as the educational standards of veterinary undergraduate training have become more stringent, there has been a gratifying increase in the professional competence of the finished product. If we accept the importance of graduate training as a prerequisite for a career in teaching and research, it is inconsistent not to insist that graduate training be of the highest quality. The future of veterinary medicine, which depends on the skills and scientific performance and insight of those formally trained in this branch of medicine, can be assured only by insisting that the character and the quality of training be subjected to constant scrutiny and patterned to meet, successfully and perhaps with distinction, the practical and scientific responsibilities that properly belong to veterinary medicine. Awareness, understanding, vision, initiative and a dedicated purpose will assure these ends. A policy of complacency, evasion, or expediency is outmoded and constitutes a serious dereliction of responsibility.

Foods Beat Population Increases.—In the past two years, world food production has increased faster than world population, the greatest relative gain being in western Europe and the Near East. Of the less well-fed regions, this trend was reversed only in Latin America. In North America, the price of food to consumers dropped much less than the price to producers.—*Certified Milk, Sept., 1954.*

Adrenal Hormone for Tetanus in Man

In India, where tetanus in man is common, of 103 treated puerperal cases since 1943, the mortality was 62 per cent. Of 12 recent patients given hormone therapy in addition to standard treatment, mortality was only 25 per cent. In the past, patients seldom survived if the incubation period was less than seven days, or if the period between first symptoms and convulsions was less than forty-eight hours. Therefore, 40 such cases were studied. All were given standard therapy; in addition, cortisone was injected in five patients and given orally to ten; hydrocortisone was given orally to five. The intramuscular injections of cortisone seemed to aggravate spasms and none of the injected five survived. However, two of five given hydrocortisone orally,

six of ten given cortisone orally, as well as three of the 20 controls survived.—*J.A.M.A., Oct. 2, 1954.*

Objectives of the American Board of Veterinary Public Health

The American Board of Veterinary Public Health, of which Dr. H. J. Stafseth is president and Dr. Martin D. Baum secretary, is a specialty and certifying board with several objectives. It is interested in the furtherance of education, training, and research in this field. The board establishes the standards for training and experience for the qualifying of specialists in veterinary public health, and gives recognition by suitable certification.

To be eligible the prerequisites are:

- 1) be a graduate of a veterinary school recognized by the American Veterinary Medical Association;
- 2) possess an M.P.H. or equivalent degree from a school of public health recognized by the American Public Health Association and have at least six years of experience in a recognized civilian or military public health agency, and have made a distinct contribution to the advancement of veterinary public health. Four years of additional experience, along with recognized accomplishments in veterinary public health may be substituted for the advanced degree;
- 3) be a member in good standing of the American Veterinary Medical Association;
- 4) submit to the board a detailed statement of his qualifications.

Veterinarians who are interested in applying for certification, and can meet the prerequisites, are invited to submit applications which may be obtained from the secretary-treasurer of the board.

Examinations will be conducted at times and places determined by the board.

Notes on Prostatic Cancer.—Cancer of the prostate gland occurs in 10 to 15 per cent of men over 50 but never in eunuchs. Bilateral orchidectomy has a marked retarding effect and the administration of female hormones is clinically beneficial. If the condition recurs, adrenalectomy is beneficial but the patient must then be kept alive with cortisone.—*Am. J. Surg., May, 1954.*

Developments in Operations of the National Board of Veterinary Medical Examiners

L. C. PAYNE, D.V.M., and J. G. HARDENBERGH, V.M.D.

Ames, Iowa, and Chicago, Illinois

IN THE SPRING of 1954, a new method of testing the competency of veterinary graduates to practice was used for the first time in this country. This occurred when three state boards of veterinary medical examiners used objective or multiple-choice questions instead of the traditional essay type of examination as a part of their licensing procedures.

The three state boards, those of California, Connecticut, and Kansas, all reported satisfactory results with a total of nearly 300 candidates examined. Before describing the objective examinations and how they are used, a review of developments in the work of the National Board of Veterinary Medical Examiners is desirable because the activities of the Board, since it was organized over four years ago, are known to relatively few veterinarians outside the membership of the Board itself. The reason is that until recently there has been little of a concrete nature to report to the profession.

ORGANIZATION OF THE NATIONAL BOARD

The National Board of Veterinary Medical Examiners was organized in 1950 during the AVMA convention in Miami Beach, as reported in the October JOURNAL for that year (pp. 344-345). It was the outgrowth of several years of study by a special committee of the Association and of prolonged consideration and considerable discussion by both the Executive Board and the House of Representatives. Finally, in 1948, the special committee proposed, and the Executive Board and the House approved, that a national board be sponsored by the AVMA. The purposes, methods of operation, membership, and other details were set forth in the committee's report of that year (JOURNAL, Nov., 1948: 526-528).

During 1949, a number of details of organizing the National Board were worked out and the organizations which were to elect the 30 members of the widely-repre-

sentative Board, nearly half of whom were to be practitioners, were asked to make their selections. At the 1950 AVMA meeting, the Board members met for the first time, organized, and adopted a constitution and a set of rules and regulations.

OBJECTS OF THE NATIONAL BOARD

Although some of its policies and procedures have been altered since the National Board first came into being, it seems desirable to set forth its basic purposes. As defined in its constitution, the object is "to advance the science of veterinary medicine; to elevate the standard of qualification for the practice of veterinary medicine; and to provide a basis for admission of qualified persons to the practice of veterinary medicine in any state, territory, or dependency of the United States, *without further written examination* by the licensing boards thereof, by giving a comprehensive examination *acceptable to such boards*, and furnishing to qualified applicants who successfully pass the examination a certificate of qualification, which examination and certificate *may be used in whole or in part* by such licensing boards *in lieu of their own* for the purpose of granting a license to practice veterinary medicine."

Certain phrases are here italicized for the purpose of emphasizing that the National Board's examinations and certificates were in no sense intended to affect the control of licensure, which is purely a function of the respective state boards. The examinations were merely to furnish the state boards a service by certifying to them the results of a comprehensive examination in veterinary medical subjects in lieu of their own existing written examinations. This point can not be too strongly emphasized because it is one which many state boards have failed to understand.

SOME INTERIM PROBLEMS

In the year following its organization, the National Board studied the many problems involved in formulating, conducting,

Dr. Payne is a member of the National Board of Veterinary Medical Examiners, and Dr. Hardenbergh is secretary.

and scoring its planned comprehensive tests and then decided to consult agencies already specializing in such work. The Board decided to adopt the so-called "objective method" which utilizes multiple-choice questions and permits "machine" scoring of examination papers, thereby eliminating the laborious, tedious and, not infrequently, variable scoring when the essay type of written examination is used.

Two examination services, highly regarded in their field, were consulted and asked to submit proposals to the National Board, the thought being that examinations would be offered to students in the veterinary colleges. After thorough consideration and following a suggestion made by the examination service which was selected to work with the Board, a basic change in procedure was adopted. It was decided that, instead of offering its examinations to veterinary students, the Board would offer them directly to state boards of veterinary examiners. Experience in some other professional fields had shown that this procedure would gain more ready acceptance of the idea of objective testing by the state boards. This change was announced in the JOURNAL (Sept., 1952:155).

RECENT DEVELOPMENTS

Progress in bringing the National Board into actual operation has been slow. It has taken much time to work out details and procedures with the professional examination agency.

Early in 1954, an agreement was effected with the Professional Examination Service, a subsidiary of the American Public Health Association. This agency was already experienced in preparing examinations for veterinarians for purposes other than licensure, such as qualifying for appointment to certain federal agencies. The agreement provided for the construction of a comprehensive, objective examination, jointly prepared by the National Board and Professional Examination Service which would be offered to state boards of veterinary examiners to use as part of their licensing procedures.

A committee of the National Board met with authorities of the Professional Examination Service (P.E.S.) in March, 1954, and selected several hundred "items" or multiple-choice questions for the preparation of an examination to be used by three state boards in the spring of 1954. As

finally constructed, the examination was composed of four parts and included questions on the following subjects:

Part 1.—Anatomy, physiology, and physiological chemistry (120 questions).

Part 2.—Pathology (including clinical pathology), pharmacology, and therapeutics (90 questions).

Part 3.—Bacteriology, hygiene (including meat and milk inspection), and parasitology (90 questions).

Part 4.—Physical diagnosis, medicine, surgery, and obstetrics (135 questions).

This made a total of 435 multiple-choice questions. Each major subject was subdivided into its minor components and a specified number of questions was assigned to each component. Example: The subject of anatomy was divided into gross anatomy (skeleton, muscles, nervous system, circulatory system, viscera, topographical anatomy); histology (tissues, organs); and embryology.

HOW THE EXAMINATION WAS USED

Following the construction of the examination as described, its availability was made known to a number of state examining boards and the three mentioned made contractual arrangements with P.E.S. for its use. The agreement provided that P.E.S. would furnish sufficient individual examination booklets (containing the selected questions), answer sheets, special pencils to be used by the candidates for marking their answers so as to permit electrical scoring, and a complete set of instructions for the guidance of the boards in administering the tests. The agreement also covered the necessary safeguards for the boards in preserving the confidential nature of the tests and included, if requested, a complete scoring and statistical analysis service. Each state board, however, was to set its own passing grade and could, if desired, do its own scoring of answer sheets.

Following completion of each part of the examination, the booklets and answer sheets were collected by the examiners; when the whole examination was finished, all booklets and answer sheets were returned to P.E.S. for machine scoring and results were reported to the respective boards. With this system, it is possible to shorten greatly the time in which scores made by the entire group of candidates are ascertained.

The fee for the use of the examination service was \$10 per person examined and

covered the various items and services already mentioned.

REPORTS ON USE OF THE EXAMINATION

At the meeting of the National Board in Seattle, Aug. 23, 1954, representatives of the three state boards reported their experiences with the objective-type examination.

The California board reported its use on 111 candidates, with excellent results according to the grade groupings or scores made by the candidates. Six (5.4%) failed, a percentage somewhat lower than the average of 8.5 per cent failures for the past ten years. The board was pleased with the test, and the reaction of candidates to the multiple-choice question examination was very favorable.

Connecticut reported that the examination was used with 31 candidates who were also given oral interviews, but no practical tests. Twenty-one candidates were licensed by the board but the number who successfully completed the objective examination was not stated. The board and the candidates were both favorable to this type of examination to determine the candidates' knowledge of veterinary medical subjects.

The Kansas state board also reported good results, one candidate out of 68 failing to pass the objective-type examination; a practical examination was also given. The reaction of the candidates, when they recovered from their initial surprise at encountering the multiple-choice type of examination questions, was favorable.

FUTURE DEVELOPMENTS

As a result of the use of an objective type of examination by a few state boards in 1954, it is anticipated that others may want to try the method this year. This would be desirable in order to furnish a greater background of experience which can be used to increase still further the efficiency of the tests. With a view to getting a broad discussion of methods of examination and licensure before the veterinary profession in general and state boards in particular, it is now planned that the preconvention conference of the 1955 AVMA convention in Minneapolis will be devoted to those subjects. Further details about the program of this conference, to which all state veterinary examining boards will be urged to send one or more representatives, will be published in the JOURNAL.

Should any state board or other interested agency desire information in the meantime, a request can be addressed to the National Board, c/o AVMA, 600 S. Michigan Ave., Chicago 5, Ill. Should any state board desire additional information about objective testing, the examination, or inspection copies of it, the request should be addressed to Professional Examination Service, 1790 Broadway, New York 19, N. Y., attention of Dr. Lillian D. Long, Director.

SUMMARY

1) The National Board of Veterinary Medical Examiners, organized in 1950, comprises a membership which is representative of all fields of veterinary medicine. Nearly half of its 30 members are practitioners.

2) The purpose of the National Board is to help provide to state examining boards an objective examination that can be used in place of the present essay-type examination used by most boards as part of their licensing procedure.

3) The objective examination was developed by veterinarians of the National Board in collaboration with Professional Examination Service; the latter agency makes the actual arrangements with state boards which want to use the service.

4) The examination is comprehensive and is designed to determine, by modern methods, the candidate's knowledge of veterinary medical subjects.

5) The candidate's competence to practice is further determined by such additional oral, practical, or other tests as the state board may choose to require.

6) The use of the objective examination service in no way affects the control of licensure which remains solely a function of the state boards as provided in their practice acts.

7) Three state boards used the objective examination service in 1954 with most satisfactory results; others are expected to use it in 1955.

8) Among the advantages of the objective examination service described are that it permits machine scoring of answer sheets; eliminates the laborious task of grading the usual essay-type examination papers, and enables results of examinations to be obtained in a short time, an important factor to both examiners and examinees.

SURGERY & OBSTETRICS

AND PROBLEMS OF BREEDING

Surgical Correction of Complete Luxation of the Elbow in the Dog

ROBERT L. LEIGHTON, V.M.D.

Springfield, Massachusetts

THE REDUCTION of elbow dislocations, especially those of long-standing, is frequently difficult. When the animal also is large and the surrounding tissues are severely traumatized and swollen, the difficulty is increased. This report concerns two dislocations which defied all efforts at reduction. Both dogs were too big and heavily muscled for the reduction to be accomplished by either manual or mechanical traction. As a last resort, it was decided to attempt reduction by surgical means.

In each case, the elbow area was clipped, prepared for surgery, and draped. An incision was made in the skin over the lateral ligament, from its origin on the lateral condyle of the humerus to its insertion on the lateral tuberosity of the head of the radius. The incision was continued deeper, so as to split but not sever the ligament, and to enter the joint cavity. Some release of the terrific tension on this ligament seemed to result from the lateral portion of the head of the radius protruding slightly through the split in the lateral ligament. It was possible to see parts of the joint surfaces. Closed, curved, blunt scissors were introduced, with the concave surface downward, between the medial aspect of the proximal extremity of the radius and the lateral aspect of the distal end of the humerus (fig. 1). The scissors were then rotated so that their concave surface was upward (fig. 2) and the tips were elevated to engage the intercondylar portion of the distal extremity of the humerus. With the forearm held so as to flex the elbow at a 45-degree angle, light pressure was applied on the scissors to pry the end of the humerus upward and laterally, resulting in easy and quick reduction (fig. 3). The scissors acted both as a lever and as a sliding surface or

skid. The success of the maneuver depended on flexing the elbow and forcing the distal end of the humerus forward enough to allow the semilunar notch of the ulna to pass over the lateral condyle and epicondyle of the humerus. The release of tension from splitting the lateral ligament also aided the reduction. Complete reduction was checked by vision, by palpation, and with a radiograph. The ligament was sutured with chromic catgut (No. 00), as was the skin. Care was taken to prevent hemorrhage into the joint.

It was felt that even if complete ankylosis should occur, it would be preferable to allowing the elbow to remain luxated. Function returned in both cases, the results



Fig. 1—Anteroposterior drawing of bones of elbow joint showing closed, curved, blunt scissors introduced with concavity down, through split in the lateral ligament. X=origin and insertion points of lateral ligament.

From the Rowley Memorial Hospital, Springfield, Mass.



Fig. 2—Anteroposterior drawing of bones of elbow joint showing closed, curved, blunt scissors rotated with concavity up.



Fig. 3—Lateral drawing of bones of elbow showing closed, curved, blunt scissors introduced into joint through split in lateral ligament preparatory to being used as a lever to force distal end of humerus forward enough to allow semilunar notch of the ulna to pass over lateral humeral condyle. The elbow should be flexed to a 45-degree angle in order to effect reduction. X=origin and insertion points of lateral ligament.



Fig. 4—Anteroposterior and lateral radiographs of a completely luxated elbow joint in an 11-year-old Collie before surgical reduction.

being satisfactory enough to indicate that this method of reduction merits further use.

CASE HISTORIES

Case 1.—A 72-lb., 11-year-old, male Collie-Shepherd suffered a complete lateral displacement of the right radius and ulna at the elbow joint in an automobile accident Nov. 28, 1953. It was referred to our clinic three days later, having resisted all efforts at reduction. Radiographs similar to figure 4 were taken and an unsuccessful attempt was made at manual reduction. The size of the dog, the duration of the luxation, and the swelling of the traumatized adjacent tissues, seemed to make replacement practically impossible, so an open reduction, as described, was done under general anesthesia. Penicillin was administered prophylactically for several days and recovery was without incident. Ankylosis was expected but the dog used the leg almost from the beginning with an increasing range of motion. At last report, the elbow joint had almost complete mobility and function.



Fig. 5—Anteroposterior and lateral radiographs of a completely luxated elbow joint of the 11-year-old Collie (fig. 4) after surgical reduction.

Case 2.—On Feb. 15, 1954, an 80-lb., 11-year-old male Collie with a complete luxation of the left elbow (fig. 4, 5) of seven days' duration was brought to the clinic. The joint had been splinted for six days, apparently having been diagnosed as a fracture. An anteroposterior radiograph, as usual in these cases, was invaluable.^{1,2} The condition of the dog was also complicated by chronic cystitis and general debility bordering on collapse.

The elbow resisted all efforts at reduction. As soon as the general health of the animal could be improved, surgical reduction, as described, was done under ether anesthesia. The leg was placed in a coaptation splint with satisfactory progress being made for the next three days. Then a period of difficult convalescence occurred, unassociated with the elbow or the operation. A variety of antibiotics were used, with erythromycin seeming the most beneficial. The splint was removed in four days and thir-

teen days later the dog began to use the limb.

When discharged on March 6, the dog was limping considerably but is now reported to be doing fairly well. There is some restriction of motion, but not enough to prevent him from gamboling playfully.

References

¹Schnelle, G. B.: Radiology in Small Animal Practice. 2nd ed. American Veterinary Publications, Inc., Evanston, Ill. (1950): 145.

²Lacroix, J. V., and Hoskins, H. P.: Canine Surgery. 3rd ed. American Veterinary Publications, Inc., Evanston, Ill. (1952): 681.

An Anesthetic Accident with a Skunk

RAYMUND G. VERNON, D.V.M.

Portland, Oregon

Skunks apparently do not tolerate anesthetics well, many dying during surgery. One even died for us when 2 per cent procaine was used locally. For that reason, an interesting experience in saving 1 which received an overdose is reported. This male skunk had been acquired by one of the clinic's nurses when it was a baby. When about 6 weeks old and 14 oz. in weight, it commenced trying to spray so it was prepared for a descending operation.

Due to a miscalculation it was given 0.6 cc. of pentobarbital sodium intraperitoneally (i.p.), more than three times the prescribed dose, enough to anesthetize a 48-oz. skunk. The mistake was noticed immediately and steps were taken to counteract the overdose. When about five minutes after the injection the skunk began to act sleepy, it was given 0.25 cc. of metrazol subcutaneously (s.c.) and 0.5 cc. i.p. In another five minutes, it was deeply anesthetized and shortly after, when its respiration and heartbeat ceased, it was pronounced dead. The operation was completed for the experience. However, during surgery, the patient jerked its head, faint but strengthening heart action was detected, and ten minutes after it had apparently died it was again breathing deeply. At 4 p.m., thirty minutes after injection of the anesthetic, it was given another 0.25 cc. of metrazol intramuscularly (i.m.) and 25 cc. of a 5 per cent glucose solution i.p.

Metrazol injections were later given at

Dr. Vernon is a small animal practitioner in Portland, Ore.

6 p.m.—0.2 cc.(i.m.); at 11 p.m.—0.2 cc. (i.m.) and 0.2 cc.(i.p.); at 4 a.m.—0.2 cc. (i.m.); and at 7 a.m.—0.2 cc.(i.m.) and 0.2 cc.(i.p.). The patient was kept warm and was vigorously rubbed whenever it received an injection. At 8:30 a.m., when respiration had again ceased for almost thirty minutes and heart action could not be detected, he was rubbed, without regard for bruising, for fifteen minutes. This stimulated respiration and after another five minutes of rubbing, heart action could be detected. He was then given 0.3 cc. of coramine, and 0.3 cc. of adrenal cortex, subcutaneously, and again rubbed for fifteen minutes.

At 9:15 a.m., an injection consisting of 10 mg. of thiamine chloride, 15 mg. of nicotinic acid, 10 mg. of ascorbic acid, 0.5 cc. of solu-zyme,[®] and 0.2 cc. of coramine was given, subcutaneously. By then, since the eyes had never closed, the corneas were dry and wrinkled so ophthalmic ointment was applied at intervals. Also the mouth, when pried open remained so, and the tongue when pinched made no response. Yet, when a sugar solution was placed on the tongue with a finger, the animal swallowed. Both sugar solution and milk were given this way.

Adrenal cortex was repeated as follows: at 10 a.m. and noon—0.3 cc.(s.c.); at 2 p.m.—0.2 cc.(i.m.); and at 5:30 p.m.—0.3 cc. (i.m.). Another 0.2 cc. of coramine was given subcutaneously at 2 p.m. and 0.3 cc. of PAM (penicillin aluminum monostearate) intramuscularly at 5:30 a.m.

At 10 a.m., more sugar solution and milk were given with a finger and the skunk swallowed easily but at 11:30 most of this liquid was vomited. Thereafter throughout that day and night, at two-hour intervals, brown karo syrup diluted with three parts warm water and diluted canned milk were given by the finger method. Somagen,[®] at 50 per cent of the recommended strength, and water were also given occasionally.

Vigorous rubbing for five-minute periods was continued at half hour intervals. By late afternoon, the wink reflex had returned. By the second morning, the patient could eat and drink freely but slept most of the time. He recovered without further complications.

Which of the various products and methods applied were most beneficial is a question. However, if a similar situation should

occur I would give metrazol immediately, then flood the peritoneal cavity with a 5 or 10 per cent glucose in saline solution, perhaps 100 cc. to a 1 lb. animal. This solution would dilute the anesthetic, retard its absorption, and possibly aid in its withdrawal. I would also repeat larger doses (0.3 cc.) of metrazol at shorter intervals (2 hours); give saline solution subcutaneously, and massage the animal more often during the first several hours.

Such a sincere attempt to rescue a small skunk might seldom be made, but it serves to illustrate that an animal may be saved from a huge dose of anesthetic. This knowledge may be of value in caring for the occasional dog or cat which fails to rally from an anesthetic.

Inseminating a Bitch with Preserved Semen

Two normal Greyhound puppies were the result of what is believed to be the first artificial insemination of a bitch with preserved semen. The semen was collected by means of an artificial vagina on May 8, 1954. The second fraction of the ejaculate, about 2 cc., was added to 14 cc. of pasteurized milk and placed in a room at 4 C. for one hundred hours. The milk had been prepared by placing 50 cc. in a shallow beaker, heating it slowly to 92 C. and, after ten minutes, allowing it to cool to room temperature. The scum was then removed by decanting the 14 cc. into a test tube. This diluted semen was held four days at 4 C. On May 12, 4 cc. was injected directly into the uterus of the maiden bitch. She whelped sixty-four days later. This method may be of value (a) when a natural mating is impossible; (b) when semen must be transported; (c) to extend the use of a stud; and (d) as a possible aid in disease control. —*Brit. Vet. J., Oct., 1954.*

Inositol in Boar Seminal Secretion

Inositol, one of the B complex vitamins, was found to compose 20 per cent of the dry weight of the seminal fluid of boars, a concentration 20 times greater than found in any other substance yet analyzed. The deficiency in this vitamin in hamsters may cause disturbances in reproduction. Since it does not influence the motility of the sperm cells, its function is obscure.—*Nutr. Rev., Oct., 1954.*

Aureomycin for Retained Placenta in the Cow

H. L. EASTERBROOKS, D.V.M., M.S., and W. N. PLASTRIDGE, Ph.D.

Storrs, Connecticut

RETAINED PLACENTA in cattle has long been a problem in practice. To "clean" or "not to clean" has been a debated question for years.¹⁻⁴ The present trend is to advise leaving the membranes intact, permitting natural sloughing while providing mild intrauterine medication.

Endometritis, metrorrhagia, pyometritis, and abscess formation⁵ have been listed among the most important sequelae to retained placenta. All of these conditions are recognized as contributors to impaired reproductive efficiency and total sterility.

Many approaches to the management of retained placenta have been and are being tried with varying degrees of success. Only the approach involving intrauterine medication will be considered in this report. The literature contains numerous references to clinical cases in which various antisepsics were used in the uterus in the management of retained placenta. However, actual data establishing the efficiency of such treatments have rarely been presented.

Among treatments recommended during the last four years are: sulfa-urea combinations,² tyrothricin or sulfa-urea-tyrothricin,³ colloidal silver oxide,³ penicillin,⁴ acriflavine or sulfa-urea-acriflavine,⁵ oxytetracycline,^{6,7} and chlortetracycline.^{8,9}

The purpose of this report is to present the clinical results of a "hands-off" management program for retained placenta in which aureomycin[®] was used as the intrauterine medicant in a dairy herd, averaging about 90 cows, over a period of three years (1950-1952). The results are supported by the breeding efficiency records of the cattle in the herd.

From the Department of Animal Diseases, Storrs Agricultural Experiment Station, University of Connecticut, Storrs.

*The trademark of Charles Pfizer and Co. for the antibiotic, oxytetracycline, is terramycin.

**The trademark of Lederle Laboratories Division, American Cyanamid Co., for the antibiotic, chlortetracycline, is aureomycin.

The authors express their appreciation to Mr. Gilbert Farrington, herdsman, University of Connecticut, for his assistance and persistence in seeing that treatment schedules were carried out as prescribed.

PROCEDURE

During the period covered by this report, 31 cases of retained placenta were treated in the University of Connecticut dairy herd. In this herd, for routine purposes, the placenta was considered as retained when it had not been expelled by twelve hours postpartum. When placental retention was in evidence to the herdsman, the staff veterinarian was notified and a visit was made to attend the animal within a few hours. All cases were treated for the first time between twelve and twenty-four hours postpartum.

Routine treatment consisted of leaving the patient in a well-bedded calving pen, thorough washing of the external genitalia with a soapy anti-septic solution, and the insertion of one aureomycin[®] tablet† as deeply into the uterus as could be easily accomplished. Treatment was administered every day or every other day up to and including the day of expulsion of the placenta. No attempt was made to remove the membranes manually. Each aureomycin tablet used contained 500 mg. of veterinary aureomycin hydrochloride, crystalline.

Following expulsion of the placenta, each cow was returned to the milking herd and from that time on was treated in all respects as a normal member of the herd.

RESULTS

Daily Treatment.—Sixteen cows with retained placentas were treated intrauterinely with 500 mg. of aureomycin daily (approximately every 24 hours). The average duration of placental retention was five and two-tenths days with an average of four and one-tenth tablets being used in the treatment of each animal. Placental retention varied within the group from two to ten days, and the number of tablets used varied from two to ten. In the following breeding cycle, these 16 animals required an average of 1.55 services per conception and as a group, with the exception of 1 which aborted from vibriosis, calved at an average of 392 days from the parturition associated with retention.

Alternate Daily Treatment.—Fifteen cows with retained placentas were treated intrauterinely with 500 mg. of aureomycin on alternate days (approximately every 48 hours). The average duration of placental retention was four and eight-tenths days with an average of two and one-tenth tablets.

†The tablets were supplied for use in this study by the American Cyanamid Company, Lederle Laboratories Division, Pearl River, N. Y.

lets being used in the treatment of each animal. Placental retention varied within the group from two to eight days and the number of tablets used varied from one to three. Subsequently, these 15 animals required an average of 1.40 services per conception and, as a group, calved at an average of 377 days from the parturition associated with retention.

Records of Normal Animals.—In order to have some controls as a basis for the comparative evaluation of the method of management of placental retention reported here, records of reproductive efficiency for cows having normal calvings were studied. Of the 62 calvings in the balance of the herd, which occurred either immediately preceding or following each of the 31 cases of placental retention, only 39 could be considered strictly normal. The other 23 were deleted since the record of each showed some abnormality such as twin pregnancy, dystocia, or help at parturition. These 39 animals which calved normally (controls) required an average of 2.07 services per conception and as a group, with the exception of 6 which aborted from vibriosis, calved at an average of 399 days from parturition.

SUMMARY AND DISCUSSION

Under the conditions reported, the reproductive efficiency of 31 dairy cows having retained placentas, which were treated with aureomycin® as described herein, was as high as the reproductive efficiency of a group of 39 companion dairy cattle which calved normally. The data are summarized in table 1.

TABLE I.—Aureomycin Therapy in Retained Placenta

| No. cases | Dose | Services per conception | Calving interval |
|-----------|------------------------|-------------------------|------------------|
| 16 | 500 mg. each 24 hr. | 1.6 | 392 days |
| 15 | 500 mg. each 48 hr. | 1.4 | 377 days |
| 39 | "Normal calvings" | 2.0 | 399 days |

The results obtained indicate that the treatment of the uterus every forty-eight hours from the first day up to and including the day of natural sloughing of the placenta, without manual intervention, prevents subsequent impairment of breeding efficiency commonly associated with retained placenta.

It should be of interest that in three other herds where this practice was tried on at least an additional 30 cows but where detailed records were not kept, the results were reported as highly favorable by the herd owners. In 1 isolated case, a placenta was retained for nineteen days. Treated as described, this animal conceived after one service.

In the entire group of 31 animals, only 2 showed evidence of septic metritis and both responded to intravenous sodium sulfamethazine therapy. Pyometra was not observed in the group.

Based on the data presented, it is the opinion of the authors that, with a method of management available as effective as the one described, manual removal of a retained placenta may actually be contraindicated.

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Effect of Relaxin on Milk Ejection

Ten ewes were milked twelve hours after their lambs were removed, then each was injected intravenously with 500 guinea pig units of relaxin and again milked in one minute; then each was given 10 I. U. of oxytocin intravenously and milked the third time. Of the total milk produced, 39.1 per cent was obtained at the first milking, 43.5 per cent after the injection with relaxin, and 17.4 per cent following the injection of oxytocin.—*J. Dai. Sci.*, Oct., 1954.

Use of Radon Implants in the Treatment of Bovine Ocular Neoplasms

R. F. VIGUE, D.V.M.

Springvale, Maine

THIS REPORT covers the successful treatment of 8 cases of epidermoid carcinoma of the eyelids of Hereford cattle by use of radon* implants (seeds).** Diagnosis was obtained in each case by histopathological examination of tissue biopsies. Repeated and sometimes drastic surgical interventions had been attempted upon 3 of the 8 animals with no permanent results. Two others received early radon therapy.

Radon implants are small, sealed, gold capillary tubes filled with the required amount of radon, the first daughter disintegration product of radium. Due to the nature of the radioactive equilibrium, it is possible to deliver a radiation dosage which is equivalent to that from a radium source. Radon implants, because of their small size and the availability of inserting instruments in varied shapes and sizes, offer some technical and economic advantages over the use of radium sources in radiation therapy of animals.

The radon implants are received from the manufacturer in a small glass ampule which is encased in a lead cylinder with a proper outer container to meet shipping regulations. At the time of use, the implants and inserters should be sterilized. The ampule is then opened and the implants placed on sterile gauze. The implant is loaded into the point of the inserting needle and is retained by a touch of sterile petrolatum. When the point of the needle reaches the site in the lesion where the radon is to be implanted, the stylet is depressed, leaving the implant at the desired location as the needle is withdrawn. Insertion is usually done in a geometric pattern which will provide one implant per centimeter in the base of the lesion.

Two types of bovine eye cancers are

found in this area. One is a leaflike growth present on the lower or upper eyelid which is very frail, breaking off easily on handling. This type has a small pedunculated base, can usually be successfully removed by surgery, and usually proves to be a squamous cell carcinoma.

The other type, the epidermoid carcinoma, is by far the most frequently encountered and is the type with which this report deals. It resembles an exuberant granulation process with a necrotic, suppurative surface (fig. 1). It is found on the membrana nictitans and/or in the lower lid and is characterized by a broad base, extending deeply into the surrounding tissue. This makes surgical removal difficult and results in recurrence in almost every instance. Frank¹ states that if these cancers go untreated and become extensive, metastasis may occur. In a recent report, Savage

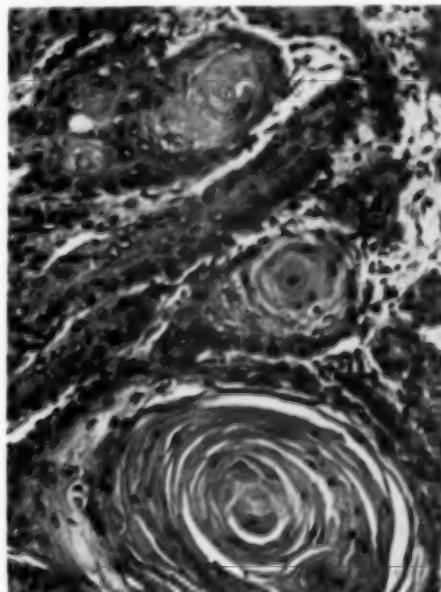


Fig. 1—Microphotograph of tissue section from cow G148. Epidermoid carcinoma, grade 2.

Dr. Vigue is a general practitioner in Springvale, Maine.

*Radon is the name suggested in 1923 by the International Committee on Chemical Elements to be used in place of the term "radon emanation."

**The radon was supplied by the Radium Chemical Co., Inc., New York 17, N. Y.

The writer is indebted to Joseph Porter, M.D., pathologist at Maine General Hospital, Portland, for examination of tissue biopsies and for the microphotograph.



Fig. 2—This photograph of cow G148 was taken Sept. 4, 1953, at time of radon implantation.

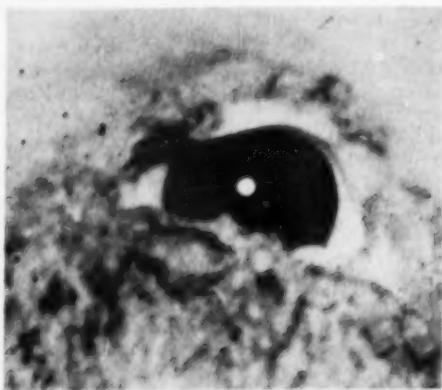


Fig. 3—This photograph of cow G148, taken one week after radon implantation, shows reaction to radon therapy.



Fig. 4—Two months post-treatment, there was complete regression of the carcinoma. No scarring remained following removal of exudate. This animal was shown in seven shows following this therapy and was the top prize winner in her class.

and Isa² found an epidermoid carcinoma, grade 2, in the pulmonary tissues of a cow and remarked that this type of cancer is typical of the bronchogenic carcinomas that so commonly occur in man.

The cancers treated in this series were all unilateral. Early treatment is imperative in this as well as other types of cancer; if the neoplasm is allowed to grow, it may eventually involve the eye proper as well as the surrounding bony structures and may even invade the sinuses, making treatment useless.

Dykstra,³ citing the work of Guilbert *et al.* on eye cancers in Herefords, states "most Herefords have red pigmented eyelids; in some the pigment surrounds one eye only, the other being free of pigment; in others, both eyes are entirely free of pigment." Data are presented by these investigators indicating a possible relationship between occurrence of cancer eye in Herefords and the nonpigmented eyelids. They think it reasonable that "the sunburning of continuously moist, nonpigmented areas of the lower eyelids is a predisposing cause of cellular derangement . . ." which, combined with a possible hereditary predisposition, may result in malignancy.

Hereditary susceptibility to carcinoma of the eye in range cattle was demonstrated in studies conducted by the Bureau of Animal Industry a few years ago.⁴ Records covering a 25-year period at the U. S. Range Livestock Experiment Station at Miles City, Mont., show that 73 mature Hereford cows developed eye cancers, an incidence of 4.7 per cent, and approximately 20 per cent of the affected animals were related, *i.e.*, dam and daughter. In one family, carcinomas had occurred in each generation since the beginning of the study in 1926. In one closed-line breeding family, the incidence of cancer approached 10.2 per cent.

Since, in most large animal practice, economics is an all-important consideration, it would not be feasible to employ radon in every case of eye cancer. However, it should be of some satisfaction to learn that a rather simple method of successfully treating bovine eye cancers is available, especially for valuable show animals, without having to resort to drastic, disfiguring surgery. Frank⁵ reported that the majority of his cases required complete removal of the eye and its appendages, to assure that

all of the neoplastic tissue had been removed.

CASE REPORT

Cow GI48 is representative of those treated with radon by the writer. This 5-year-old Hereford was first observed in April, 1953. The lesion was located on the lower lid of the left eye at the 5 o'clock position and measured approximately 1.5 by 1.0 by 0.7 cm. It was removed under local anesthesia and diagnosed as an epidermoid carcinoma, grade 2 (average malignancy). The laboratory report stated: "The tumor extends to all excised margins, infiltrating into the surrounding tissue. It is obviously of epithelial origin and is apparently arising from the surface epithelium; the underlying tissue has been infiltrated with masses of cells which, in part, are differentiating very well, inasmuch as they are forming epithelial pearls (fig. 1) and toward the center the cells have well-defined cell borders, with intercellular bridges; however, there are large portions of this tumor, particularly in the deeper areas where it is less differentiated and no evidence of keratinization is seen; the cells tend to be somewhat smaller, with very hyperchromatic nuclei, and show numerous mitotic figures."

This cancer recurred and in July, 1953, the animal was again subjected to surgery, this time under general anesthesia, with a much larger section of the eyelid being excised in an attempt to remove all of the neoplastic tissue. Within one month, there was a second recurrence (fig. 2). With the owner's consent on Sept. 4, 1953, seven 3-mc. radon implants were inserted into the base of the cancer at positions from 4 to 8 o'clock on the lower lid.

Following the implantation, there was a pronounced tissue reaction lasting approximately one week (fig. 3). This was followed by a gradual regression of the lesion leaving no discernible scarring (fig. 4). The illustrations (fig. 2 to 4) serve to show the progress of this case.

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Vertebral fractures, usually multiple, associated with prolonged cortisone and corticotropin therapy have been reported in 16 persons in recent years.—*J.A.M.A.*, Oct. 2, 1954.

Multiple Ova in Graafian Follicles

When a naturally tailless bitch was bred to a normal male, the resulting tailless or short-tailed female puppies were found to have two to eight ova (usually an even number) within their graafian follicles. Further studies will be made by comparing the number of corpora lutea with the number of pups in the litter to determine whether more than one ova in these follicles is fertilized.—*Vet. Bull.*, Oct., 1954.

An Unusual Ectopic Pregnancy

At the termination of a woman's third pregnancy, the fetus was found to be outside of the flattened uterus. Laparotomy revealed an extraperitoneal, intraligamentous, ectopic pregnancy, the result of an erosion of the fallopian tube which allowed the fetus to grow between the layers of the broad ligament. The fetus, which was clearly visible through the thin membrane, was removed alive. However, because of its attachments to the pelvic tissues which made removal hazardous, the fetal membranes and placenta were left intact. Eventually they were resorbed and the patient made a complete recovery.—*Brit. M. J.*, Sept. 18, 1954.

Induced Ovulation and Insemination.—When the corpus luteum was completely enucleated from the ovary in 41 cows in an Australian experiment, the onset of estrus occurred in two to four days in 37 and on the fifth day in 2. When these cows were artificially inseminated, 60 per cent conceived from the first insemination. This method is indicated where heifers are not under surveillance and in remote herds.—*Austral. Vet. J.*, Aug., 1954.

CLINICAL DATA

Visceral Lymphosarcoma of the Cat. II

JEAN HOLZWORTH, D.V.M., and SVEND WOGE NIELSEN, D.V.M.

Boston, Massachusetts

IN A PREVIOUS study,⁶ earlier reports of lymphosarcoma in the cat were surveyed, and 15 cases diagnosed at the Angell Memorial Animal Hospital were reported. In this group, tumor development was limited almost entirely to the abdominal organs, the intestine and kidneys being most frequently involved. Subsequent cases observed at the Ontario Veterinary College and at Angell Memorial Animal Hospital confirm the authors' impressions as to the peculiar frequency of this growth among cats, the only exception to the picture previously established being that the intestinal tumor has, in several instances, occurred in younger animals than any of those in the earlier group (1 was only 1½ years old). It is of practical interest that in 1 cat, with no mesenteric node involvement, a tumor of the ileocolic junction and cecum was removed, and an anastomosis was successfully performed.

In the previous study, the spleen, although a lymphoid organ, appeared only rarely as a site of gross tumor development. Occasionally, however, sizable splenic growths may occur, as in a 5½-year-old male cat, with mesenteric node tumors as well (fig. 1).

and anemia were associated with large ulcerated tumors of the gastric wall (fig. 2).

Finally, another organ rarely affected, the pancreas, was observed as the principal tumor site in a 15-year-old spayed female with symptoms of rapid weight loss, diminished appetite, moderate hyperglycemia and glycosuria, and marked leukocytosis. The thoracic and mesenteric nodes were also tumorous, and in the mediastinum at the site of the thymus there were streaks of thickened pale tissue.

Besides the foregoing addenda to the previous study, this paper will present 12 cases in which lymphosarcoma of the neck and thorax was the outstanding finding, all but 2 providing examples of a tumor of the precardiac or anterior mediastinum which would seem to constitute as much of an entity in the thoracic pathology of cats as do the intestinal and kidney tumors in abdominal pathology.

MATERIAL AND METHODS

Of the entire group, 8 cases were diagnosed at the Ontario Veterinary College and 7 at Angell Memorial Animal Hospital. Tissues were fixed in formalin, embedded in paraffin, and stained with hematoxylin-eosin. In several of the Ontario cases, a rapid histological diagnosis was made at autopsy by means of Wright-stained smears (fig. 3A and B), a method suitable for a practitioner's laboratory.



Fig. 1—Lymphosarcomatous nodules in the spleen of a male cat, 5½ years old.

In view of the fact that involvement of the stomach also appeared to be rare, mention should be made of a 7-year-old male in which emaciation

tory, where little equipment is available, and previously described in connection with the diagnosis of malignant lymphoma¹ and of mastocytoma in dogs.²

LYMPHOSARCOMA OF THE MEDIASTINUM

Clinical Picture.—The age range in the

Dr. Holzworth is a member of the clinical staff, Angell Memorial Animal Hospital, Boston, Mass. Dr. Nielsen, resident in pathology at Angell Memorial Animal Hospital in 1951-1952, is now lecturer in pathology, Ontario Veterinary College, Guelph.

Fig. 2—Lymphosarcoma of the stomach wall of a cat. Three pale, thickened, tumorous areas are present; that to the left has a small bleeding ulcer at its center.

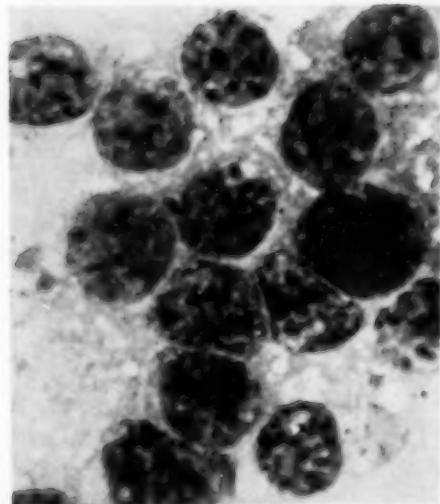
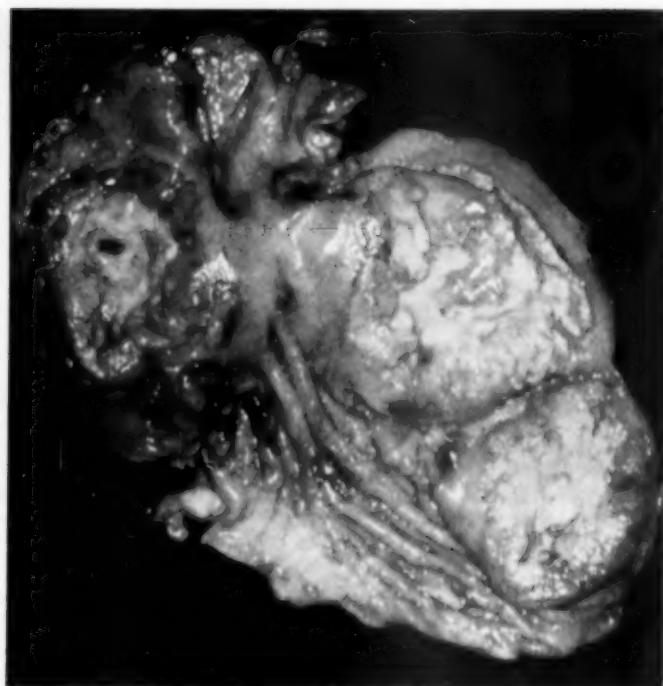


Fig. 3A—Impression smear from a mass in the pre-cardiac mediastinum, stained for five minutes with Wright's stain. The nuclei of the large lymphoblasts are rich in chromatin. $\times 600$.

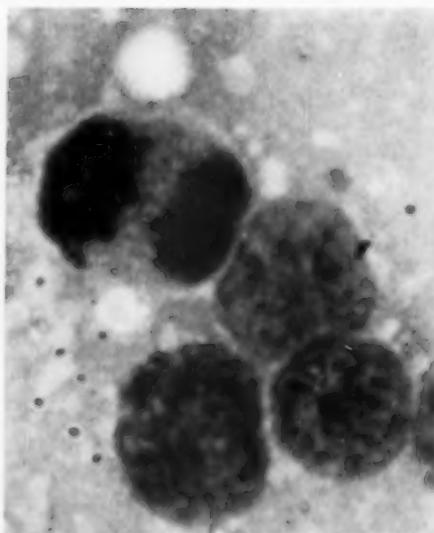


Fig. 3B—Detail from an impression smear showing four large tumorous lymphoblasts, one of which is undergoing mitosis. Compare for size with the red blood cell just above. $\times 950$.

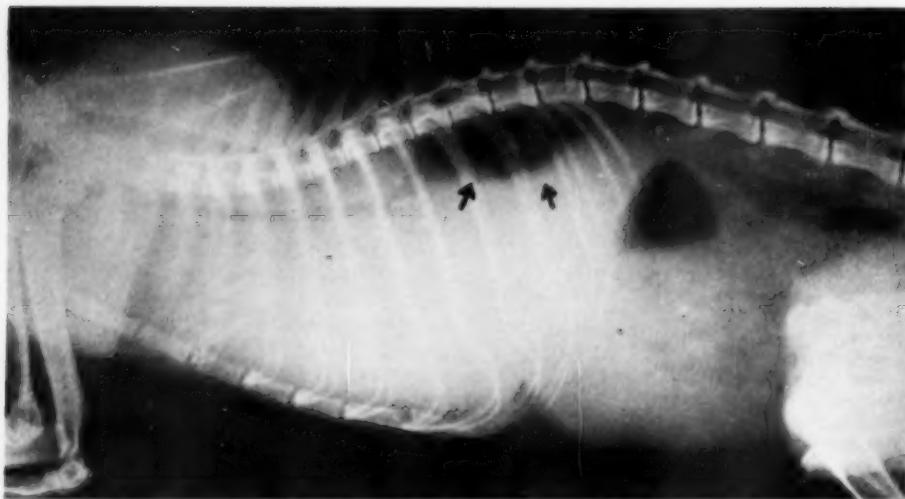


Fig. 4—Lymphosarcoma of anterior thorax of a 2-year-old castrated male cat. A lateral radiograph taken with the cat standing shows accumulation of fluid to a high level (arrows) in the chest.

group of cats with tumors of the precardiac mediastinum was wide, from 1½ to 9 years. Five were males, 2 of them castrated; 4 were females, 2 of which were spayed;

while in 1 case there was no record of the sex.

As with the cases of abdominal tumor previously reported, the duration of clinical

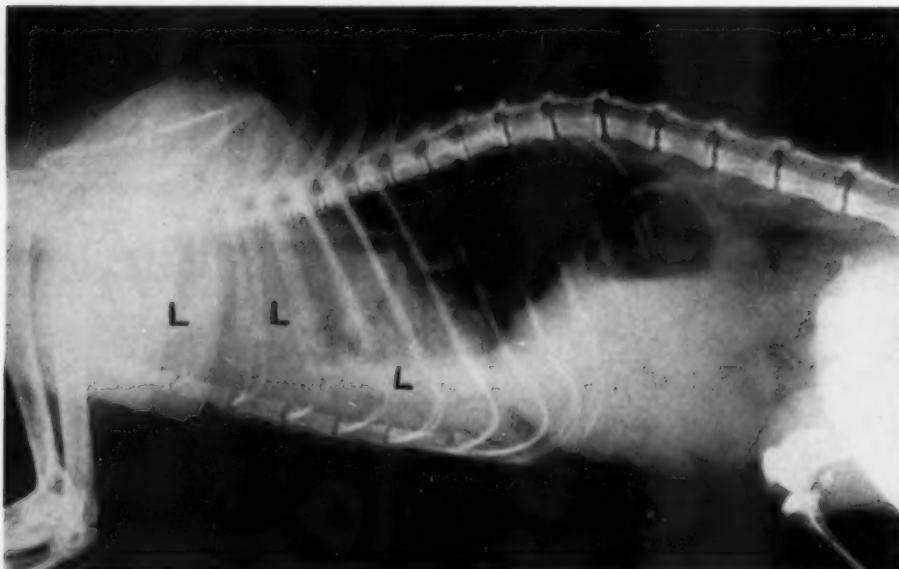


Fig. 5—Lymphosarcoma (L) of anterior thorax after removal of transudate, same cat as in figure 4.

disease seemed to be short when considered in relation to the extent and magnitude of tumor development. In one instance, the course of illness was less than two weeks, and in none of the cases in which adequate information was available was the animal ill for more than six weeks before acute terminal symptoms developed. Typically, the first symptom observed is an occasional gagging cough; later there is gagging and choking on the larger food morsels, so that the cat eats less and loses weight. Only at the very end does labored abdominal breathing appear. Although there was evidence in 1 animal that the mediastinal tumors may develop with striking rapidity (in a 1½-year-old cat, a chest radiograph taken only 1 month before death was negative), it would seem that the extraordinary ability of cats to adapt to disorders which severely limit expansion of the lungs must in part account for the fact that the manifestation of disease is so long delayed.

Less common symptoms were anemia, edema of the brisket, a "tinny" purr, cardiac murmurs, and muffling of heart and lung sounds. In 2 cats both kidneys were enlarged. Fever was usually absent.

Diagnosis.—A good history and a thorough clinical examination often provide ample grounds for a tentative diagnosis of

lymphosarcoma of the thorax, but it is frequently desirable to resort, for confirmation, to radiographs, tapping of the chest cavity, and laboratory examinations.

Since fluid regularly accumulates in the pleural cavity as a result of circulatory disturbance associated with the mediastinal tumors, a lateral radiograph of the chest, taken with the cat standing, typically shows a high, horizontal "fluid line" (fig. 4). If the fluid is withdrawn, a second radiograph discloses abnormal shadows in the anterior and lower portions of the chest (fig. 5). Occasionally, in cases where gagging occurs, the trachea and esophagus are displaced upward, a finding strongly suggestive of tumor (fig. 6).

Typically, the fluid associated with thoracic lymphosarcoma has the character of a transudate; occasionally there is slight opacity, and a few bacteria and blood cells may be present, perhaps owing to a secondary pleuritis. It may be possible, as in 1 of the Ontario cases, to demonstrate anaplastic or immature lymphoid cells by examination of a stained smear of sediment from the transudate.

Leukocyte counts, done in only 3 cases, would seem sometimes to supply useful evidence. In 1, the total count was elevated, and histological examination of the tissues after death revealed an increased number



Fig. 6.—Lymphosarcoma of anterior and ventral thorax of a 6-year-old spayed female cat. After removal of fluid, upward displacement of the trachea (arrows) by the tumor is clearly distinguishable.

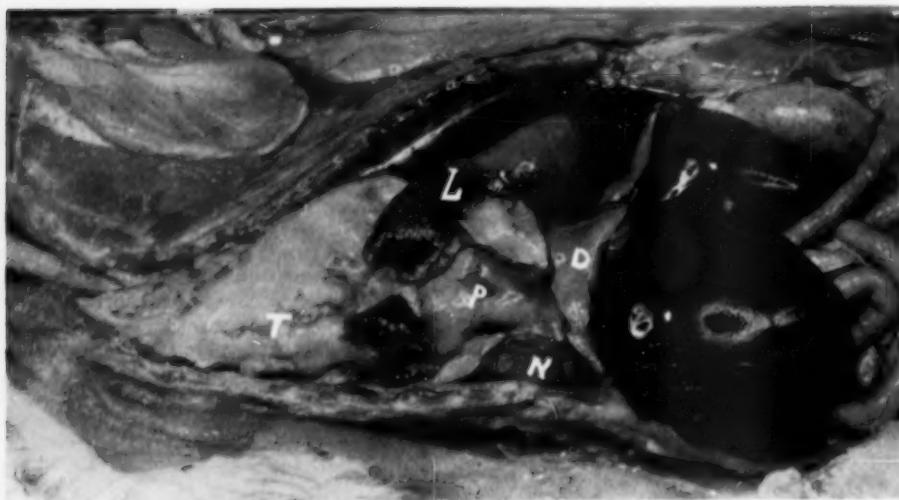


Fig. 7—Lymphosarcoma of anterior and ventral thorax, left lateral view. To the left, the tumor (T) is seen crowding the thoracic inlet, involving and entirely concealing the trachea, esophagus, and mediastinal nodes. Ventrally, the tumor mass has a dark, hemorrhagic area and extends backward, completely surrounding the pericardium (P). The lung (L) is displaced back into the upper part of the chest; the apical lobe and portions of the cardiac and diaphragmatic lobes are atelectatic. The posterior sternal lymph node (N) is tumor-infiltrated. The diaphragm (D) is not affected.

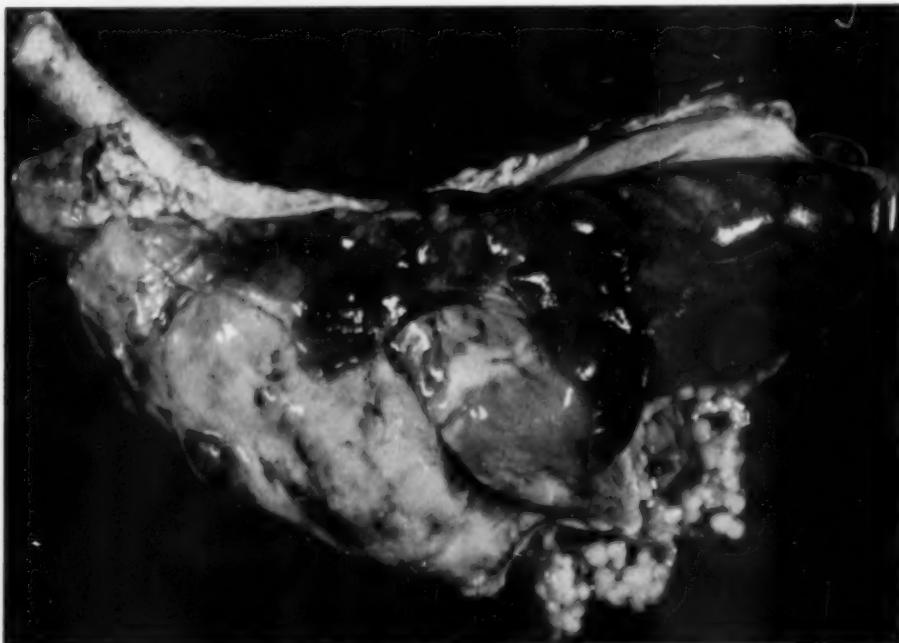
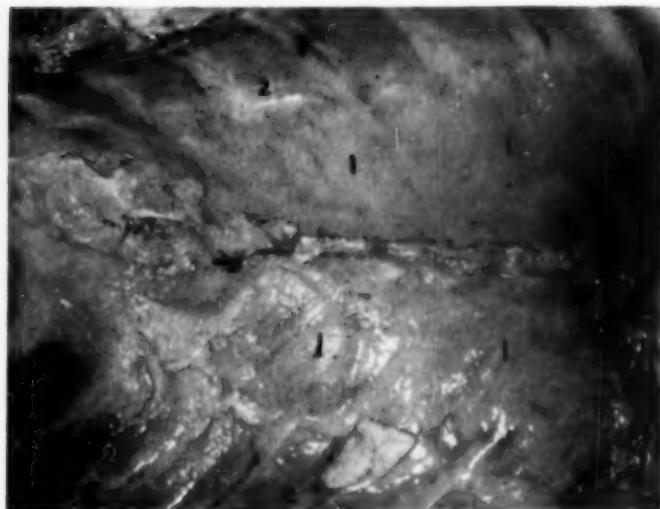


Fig. 8—Lymphosarcoma of anterior and ventral thorax. The tumor is seen to the left, below the trachea, apical lobe of lung, and heart. The pericardium, which was enveloped by the tumor, has been opened. There are small "beads" of tumor in the posterior mediastinum.

Fig. 9—Lymphosarcomatous covering (1) of the chest floor, with infiltration of intercostal muscles (2), in a spayed female cat, 1½ years old.



of lymphoid cells in the blood vessels. In another, a moderate leukocytosis was due to neutrophilia. In the third, the total leukocyte count was only moderately elevated, but 94 per cent of the cells were lymphocytes, many of them immature.

Intestinal masses or enlargement of the kidneys, with or without signs of impaired kidney function, should be considered as confirming evidence when a diagnosis of lymphosarcoma of the thorax is under consideration.

An exploratory operation would appear to be required only when all other diagnostic measures have proved inconclusive, and there remains the possibility of diaphragmatic hernia with accumulation of fluid resulting from incarceration of some abdominal organ in the lower portion of the chest.

Differential Diagnosis.—Other conditions that may present symptoms similar to those in mediastinal lymphosarcoma are diaphragmatic hernia, hemothorax, pneumothorax, pyothorax, and hydrothorax due to anemia, cardiac disease or anomalies, or cirrhosis of the liver. The first three conditions almost always originate in injuries; usually the cat has been in good health until the sudden onset of acute dyspnea, often observed first after a fall or an injury, or simply after an absence from home. A lateral radiograph of the chest, with the cat standing, and, in some cases,

tapping of the chest will suffice to provide a diagnosis. In pyothorax there is usually a history of gradual onset, inappetence, thirst, dehydration, and progressive respiratory difficulty; fever is usually, but not invariably, present. If a lateral radiograph of the chest taken with the cat standing reveals a fluid line, tapping will demonstrate the presence of pus. In hydrothorax, due to heart abnormalities, cirrhosis of the

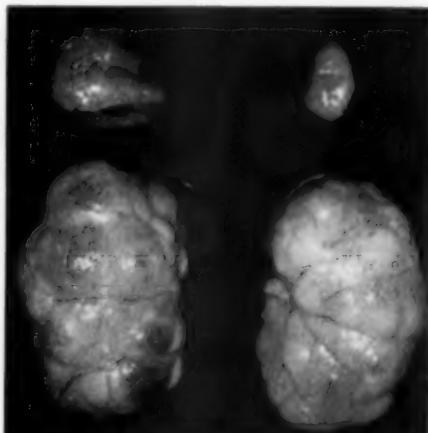


Fig. 10—Bilateral lymphosarcoma of adrenals and kidneys in a spayed female cat, 7 years old, with thoracic lymphosarcoma.

liver or, more rarely, anemia, the fluid, as with lymphosarcoma, will have the character of a transudate but, when a second radiograph is taken after tapping, no shadows suggestive of thoracic neoplasm should be seen.

Gross Pathology.—In all 10 cats with mediastinal tumors, the anterior ventral portion of the chest was found to be crowded with a growth of uniformly soft yellowish or greyish white tissue, varying slightly from case to case in surface irregularity or lobulated effect. Usually this mass engulfed, or merged imperceptibly with, the sternal and mediastinal nodes (fig. 7, 8); occasionally the nodes remained discrete but appeared themselves to have undergone tumorous change. In some instances, there were adhesions between the median mass and the thoracic walls. In 1 case, although the tumor did not adhere to the thoracic walls, a cream-colored growth 1 to 3 mm. thick coated the ventral pleura (fig. 9) and infiltrated the intercostal muscles. Typically, the tumor encased the heart and pushed it back, infiltrated the great vessels at their origins, and displaced the lungs up and back, producing atelectasis of all but the upper portion of the diaphragmatic lobes. In some cases, the trachea and esophagus were bowed upward. Gross involvement of the lungs was rare, but focal lymphocytic or lymphoblastic infiltration was occasionally recognized microscopically.

Usually there was lymphosarcomatous change elsewhere in the body as well—in the cervical and mesenteric nodes, liver, adrenal glands (fig. 10), kidneys (fig. 10),

or ileum. Microscopic tumor infiltration was also recognized in thyroid, lungs, spleen, adrenals, and pancreas.

The 2 remaining cases in the group are notable for the unusual manifestation of the tumor. In 1, lymphosarcoma was limited to one tonsil, and there appeared to be no associated change in the cervical nodes. In the other, which provided an unusual opportunity to observe the development of the disease, symptomless firm cervical swellings constituted the first sign of illness. Although some type of lymphoid malignancy was suspected from the beginning, blood studies done on several occasions revealed no pathognomonic changes. About a month after the cervical enlargements were noticed, the cat was observed to be drinking and eliminating more water than before. Nodular enlargement of both kidneys was detected by palpation, the specific gravity of the urine was low, and the blood urea was found to be 156 mg./100 ml. Subcutaneous administration of isotonic dextrose brought about some improvement in the cat's condition, lowering the blood urea to 45 mg., but within a few days after discharge symptoms of cardiac failure and pulmonary congestion developed, and the cat was returned to the hospital to be destroyed. Autopsy disclosed tumors of both mandibular salivary glands, the right retropharyngeal lymph node, heart (fig. 11), and kidneys. Infiltration of the thyroid was recognized microscopically. Hydrothorax and hydropericardium were also present.

Microscopy.—Histological examination of tissue from 12 cases of cervical and thoracic

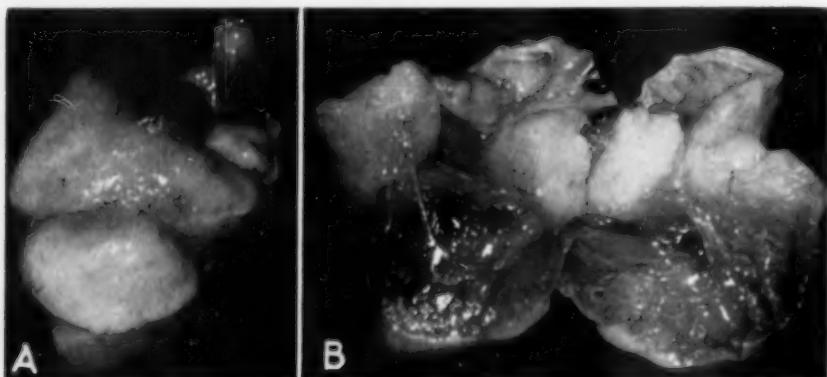


Fig. 11.—Lymphosarcoma of the heart in a 5-year-old castrated male cat (A-intact, B-opened).

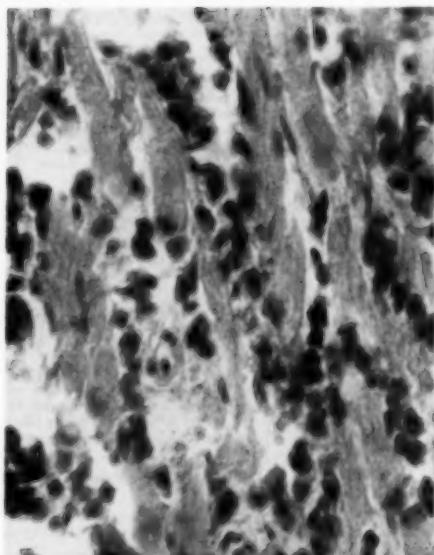


Fig. 12—Histological section showing lymphosarcoma of low-grade malignancy infiltrating the myocardium. $\times 100$.

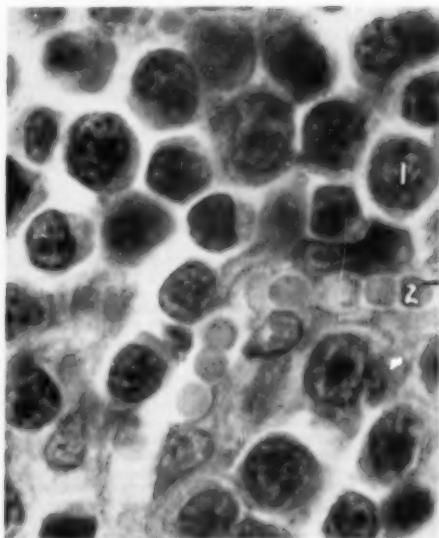


Fig. 13—Highly malignant lymphosarcoma, with lymphoblasts surrounding a capillary. Compare for size the lymphoblasts (1) and the red blood cells (2). $\times 450$.

lymphosarcoma revealed that the tumors varied in type from low-grade lymphocytic to lymphoblastic of grade IV malignancy

(fig. 12, 13, 14). In general, animals suffering more extensive visceral involvement appeared to be affected with the more ma-

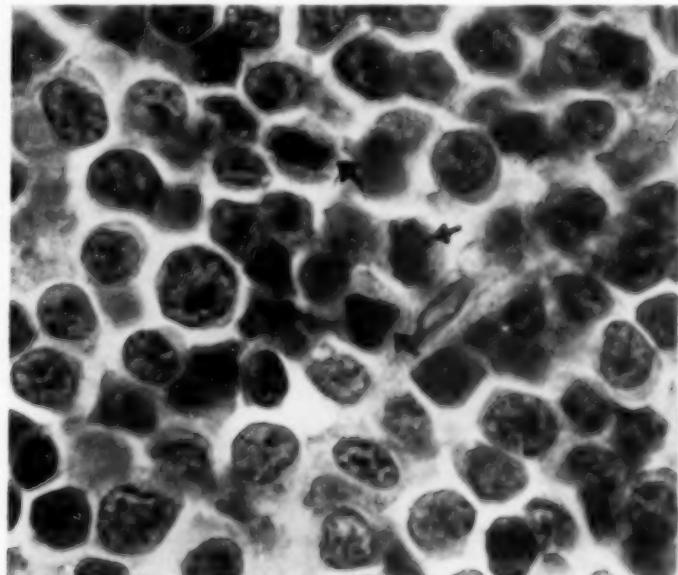


Fig. 14—Highly malignant lymphosarcoma characterized by mitoses and pleomorphic (arrows) lymphoblasts. $\times 450$.

TABLE I—Clinical and Pathological Findings in 15 Cases of Visceral Lymphosarcoma in Cats

| Sex, age, color | Clinical history and manifestations | Diagnostic procedures | Preliminary diagnosis | Termination | Autopsy findings | Tumor cell type and malignancy |
|------------------------------|---|--|------------------------------|-------------|--|---|
| M, 5½ yr. | Course 8 weeks: unthriftiness, extreme weight loss. | Palpation. | Suspected malignancy. | Destroyed. | Tumor of mesenteric nodes, spleen. | Lymphoblastic grade II (preliminary diagnosis by impression smear stained with Wright's). |
| M, 7 yr., tabby. | Course 6 weeks: anorexia, weight loss, anemia, icterus, dehydration, kidney enlargement, palpable mass anterior to left kidney. | Palpation, radiograph, blood urea (normal), urinalysis (insignificant except for bile pigment and indican). | Multiple lymphosarcoma. | Destroyed. | Tumors of lungs, liver, stomach, kidneys, adrenals (micr.), lymph nodes; hydrothorax, ascites. | Lymphoblastic grade III. |
| SF, 15 yr., black and white. | Course 2 weeks: inappetence, rapid weight loss, later diarrhea, dyspnea, muffled heart sounds; abdominal mass. | Palpation, radiographs, hematology (marked leukocytosis, normal differential), blood sugar (slightly elevated), urinalysis (sugar +), exploratory operation. | Pancreatic tumor. | Destroyed. | Tumors of thoracic nodes, thymus (incipient), pancreas, mesenteric nodes. | Lymphoblastic grade III. |
| M, 1½ yr. | | | Tumor of chest. | Died. | Tumor of chest cavity. | Lymphocytic, grade I, probably originating in thoracic nodes. |
| SP, 1½ yr., tricolor. | Course 4 weeks: weakness, anemia, heart murmur, edema of brisket; later loss of weight, hydrothorax, gagging. | Hematology (leukocytosis, anemia; lymphocytosis later recognized histologically), examination of thoracic fluid (modified transudate), radiographs. | Thoracic tumor or granuloma. | Died. | Tumor of anterior thorax surrounding trachea, esophagus, thoracic nodes, heart; tumorous infiltration of ventral thoracic wall; tumors (micr.) of liver, spleen, adrenals. | Lymphoblastic grade III. |
| CM, 2 yr., grey and white. | Course 4 weeks: dyspnea, inappetence, occasional cough. | Radiographs, thoracentesis, exploratory operation. | Lymphosarcoma of thymus. | Destroyed. | Tumor of anterior thorax, involving thoracic nodes, pericardium, pleura; tumors of cervical nodes, liver, mesenteric nodes, kidneys. | Lymphoblastic grade III. |
| CM, 3 yr., silver tabby. | Course about 2 weeks: anorexia, weight loss, marked dyspnea, hydrothorax. | Radiographs. | Thymic tumor. | Destroyed. | Tumor of precardiac mediastinum, entirely surrounding heart. | Lymphoblastic grade III. |
| M, 9 yr. | | | Thymoma. | Died. | Tumor of anterior mediastinum, partially obstructing esophagus. | Lymphoblastic grade III. |

TABLE I (Continued)—Clinical and Pathological Findings in 15 Cases of Visceral Lymphosarcoma in Cats

| Sex, age color | Clinical history and Manifestations | Diagnostic procedures | Preliminary diagnosis | Termination | Autopsy findings | Tumor cell type and malignancy |
|-----------------------------------|--|--|--|--|--|---|
| F, 4-5 yr., silver Persian. | Course 4 days: severe dyspnea, cyanosis, labored breathing, muffled heart and lung sounds, edema of brisket, "tiny" purr, kidney en- largement, fever. | Radiograph (sug- gestive of pleural ef- fusion and pulmonary collapse), examination of thor- acic fluid (tumorous lymphoblasts), exploratory operation. | Diaphragmatic hernia. | Destroyed. | Tumor of anterior thorax, com- pletely sur- rounding heart. | Lymphoblas- tic grade III. |
| SF, 7 yr., silver tabby. | Course 12 days: inappetence, gagging, anemia, cyanosis, labored abdominal breath- ing, muffling of heart and lung sounds, edema of brisket, "tiny" purr, kidney en- largement, fever. | Radiographs, thoracentesis (transudate, gram + cocci), hematology (leuko- cytosis, neutrophilia, moderate anemia), urinalysis (alb. ++ +, bile +). | Lympho- sarcoma of thymus and kidneys. | Destroyed. | Tumors of cervical nodes; tumor of anterior mediastinum involving sternal and mediastinal nodes; tumors of adrenals, kidneys; tumors (micr.) of lungs, liver. | Lymphoblas- tic grade IV. |
| F, 7½ yr., tricolor. | Course 6 weeks: anorexia, retching, finally dyspnea, hydrothorax. | Radiographs, thoracentesis (clear serous fluid). | Lympho- sarcoma of thymus. | Destroyed. | Tumor of an- terior medi- astinum, liver, left kidney. | Lymphoblas- tic grade III. |
| 9 yr. | Course over 2 weeks: occasional vomiting, finally occurring each time cat ate, 10-15 minutes after feeding; gradual weight loss; tran- sient enlargement of lymph nodes of head and neck. | Radiographs of abdomen (neg.), exploratory oper- ation. | Thoracic lympho- sarcoma. | Died after anesthe- tization for ex- ploratory operation. | Tumor filling anterior tho- rax from an- terior to thoracic in- let to heart; hydrothorax. | Lymphoblas- tic grade III, presumably originating in thymic vestiges (a few epithe- lioid cells but no Has- all's cor- puscles were seen). |
| M, 9 yr. | Course 6 days: listlessness, anemia, distended abdomen, enlarged liver. | Palpation hematology (moder- ate leukocytosis, 94% lymphocytes, mostly immature, moderate anemia) blood urea (slight- ly elevated). | Leukemia. | Destroyed. | Tumor of precardiac mediastinum, sternal nodes, liver, ileum. | Lymphoblas- tic grade IV. |
| M | Enlarged tonsil; no palpable enlarge- ment of superficial nodes. | Biopsy. | Hyperplasia of tonsil. | — | Tumor of tonsil. | Lymphocytic grade I. |
| CM, 5 yr., cream and white. | Course 5 weeks: cervical enlargements; late lethargy, anor- exia, gagging, poly- dipsia, kidney en- largement and incom- petence; terminally dyspnea and cardiac failure. | Palpation, radiographs (kid- ney enlargement and shadow at bron- chial bifurcation), hematology (nego- tive), blood urea (elevated), urinalysis (fixed specific gravity, albuminuria). | Lympho- sarcoma of kidneys and lymph nodes. | Destroyed. | Tumors of mandibular salivary glands, right retro- pharyngeal lymph node, heart, kid- neys, thyroid (micr.); hydrothorax, hydropere- cardium. | Lymphocytic grade I. |

lignant forms of the tumor. The large mediastinal tumors of the anterior thorax would appear to be identical with those which have hitherto been termed lymphosarcoma or lymphoid tumors of the thymus.²⁻⁴ Their anatomical position indeed supports such a designation but, inasmuch as in some cases they form a single mass with the sternal and mediastinal lymph nodes, one can not ignore the possibility that they may arise in these nodes. In none of our cases has typical thymic tissue characterized by Hassall's corpuscles been recognized, although in one tumor a few large epithelioid cells were seen.

SUMMARY

Fifteen cases of visceral lymphosarcoma in the cat have been presented. Three, included as addenda to an earlier study of abdominal lymphosarcoma, provide instances of tumor development in organs rarely affected—the spleen, stomach, and pancreas. In 2 other cats, the tumor assumed an unusual form, involving in 1, one tonsil; in the other, both mandibular salivary glands, one retropharyngeal node, the heart, and both kidneys.

Ten tumors of the precardiac mediastinum constitute a group representing what is commonly called "lymphosarcoma of the thymus." Since, however, there was minimal histological evidence of such origin, the topographical term has been considered preferable.

This mediastinal tumor, like lymphosarcoma of the intestine and kidneys, must be kept in mind by the clinician as an entity with a significant predilection for cats. Gagging cough, difficulty in swallowing, and edema of the foreparts are among the symptoms first noticed. Ultimately, dyspnea results from interference with circulation and the accumulation of fluid in the pleural cavity. Such is the ability of cats to adjust to abnormal conditions in the chest that the owner is likely to become aware of serious trouble only when the animal rather suddenly develops signs of agonizing respiratory difficulty.

This condition must be differentiated from others with which it has certain symptoms in common—diaphragmatic hernia, pneumothorax, hemothorax, pyothorax, and hydrothorax due to anemia, disease or anomalies of the heart, or cirrhosis of the liver. Radiography of the cat in the stand-

ing position establishes the presence of fluid in the chest, and another picture taken after removal of the fluid reveals abnormal shadows in the anterior and lower regions of the thoracic cavity. A Wright's stain of sediment from the transudate may demonstrate immature lymphoid cells.

A similarly stained impression smear is a practical and rapid means of establishing the histological nature of the tumor at autopsy.

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Infectious Myelitis of Cats

Two isolated cases of a nervous disorder in young cats is reported from Ceylon. The signs and lesions resemble those described in the hyperacute form of infectious myelitis of cats, previously described in Morocco. No bacterial or protozoan agents were evident but the disease seemed to be transmissible to young kittens by instillation of washings of the meninges, brain, and cord.—*Vet. Bull., Oct., 1954.*

Eye Changes in Dapple-Colored Dogs

Dogs with a dapple-colored coat such as the dappled Dachshunds and merled Collies, frequently have "wall eye"—a partial or total discoloration of the iris but they always have an anomalous tapetum. It is usually lacking and when present is rudimentary. The dappled animal is heterozygous, possibly with a gene responsible for this coloring. This gene is productive of gross ocular anomalies in the homozygote which shows marked depigmentation of the coat and, frequently, deafness as well. A somewhat similar condition occurs in the Great Dane.—*Vet. Bull., Oct., 1954.*

Studies on the Pharmacodynamics of Succinylcholine Chloride in the Horse

THEODORE H. BELLING, Jr., D.V.M., M.S., and NICHOLAS H. BOOTH, D.V.M., M.S.

Fort Collins, Colorado

THE FIRST publications on the application of muscle relaxants in large animals were those of Tavares de Macedo *et al.*²¹ and Pires.¹⁸ They employed a curare-like preparation called bebeerine dimethylether methochloride in cattle and horses.

LITERATURE CITED

Following these reports, Jones¹² made a limited survey of the effects of d-tubocurarine chloride in lambs, pigs, and calves; his survey was followed by a pharmacodynamic study of the drug in the horse by Booth and Rankin.¹ A clinical report by Rankin and Johnson¹⁰ pointed to the efficacious use of curare in the restraint of the horse in castration procedures.

Although curare has facilitated some of the examination and surgical procedures which heretofore have been difficult and time-consuming, the ability of skeletal muscle to react to neural reflex activity has not been entirely eliminated by its administration. Moreover, the range is narrow between the dose of curare which paralyzes skeletal muscles of the limbs and of the respiratory apparatus. In a search for a skeletal muscle-relaxant capable of abolishing reactions, yet one having a wider margin of safety than curare, studies have been made with succinylcholine, first synthesized in 1906 by Hunt,¹² and with related drugs the past few years. It was, therefore, decided to determine the value of succinylcholine as a skeletal muscle-relaxing agent in the horse.

In 1941, Glick¹⁰ synthesized succinylcholine and noted that it was readily hydrolyzed by an esterase found in horse serum, and by alkali. Bovet *et al.*, in 1949, first demonstrated its powerful neuromuscular-blocking activity; at the same time in this country, through independent research, Castillo and deBeer¹ revealed this skeletal muscle-relaxing effect.

Structurally, succinylcholine consists of two molecules of acetylcholine linked together at the *alpha*-methyl position and is sometimes referred to as diacetylcholine.¹

The action of succinylcholine differs from that

of curare in that it produces a persistent depolarization of the motor end-plates of skeletal muscle and the surrounding muscle cell instead of inhibiting the depolarizing action of acetylcholine.⁶ Also, succinylcholine has an action similar to that of decamethonium (C10), which differs from that of curare in that the drug first stimulates contraction of skeletal muscle before paralysis takes place.¹⁹ This stimulation probably accounts for the muscle fasciculations or fibrillations which are seen at the onset of action of the drug. In man, these are seen most easily in the facial muscles and in the muscles of the hand.²⁰ These fasciculations are followed by complete relaxation.^{9, 10, 11}

Von Dardel and Thesleff⁶ have been unable to show any histamine-freeing effect of succinylcholine. They did not observe any variation in the blood pressure or in the circulatory organs following administration of the drug. Bourne *et al.*⁷ reported that succinylcholine is a very weak histamine liberator (compared with curare, it liberated only about 1/100 the amount of histamine from the tissues). The drug preparation does not affect autonomic nervous transmission or intestinal motility.⁶

Succinylcholine is hydrolyzed into two normal metabolites, succinic acid and choline,⁸ by the pseudocholinesterase enzymes of the blood plasma.¹⁴ Whittaker and Wijesundara²² have shown that succinylcholine is rapidly hydrolyzed into succinylmonocholine and choline, with the hydrolysis of succinylmonocholine into succinic acid and choline occurring more slowly. This manner of detoxification probably accounts for the low toxicity of the drug.

Succinylcholine has been used in the human field for many surgical operations.¹ This drug is not an anesthetic, but merely a muscle relaxant with no effect on the sensory nerve endings. Therefore, it should be used in conjunction with an anesthetic for surgical procedures. It is of interest that this drug does not synergize or potentiate the effects of any of the inhalation anesthetics,¹ and that it has been used successfully with the barbiturate anesthetics.⁹

A review of the literature did not reveal any practical applications of succinylcholine in the veterinary field. It has been used on experimental animals such as the rabbit, cat, mouse, and frog by Castillo and deBeer.¹ Bovet *et al.*¹ have done experimental work with the drug in dogs. Colvin⁸ mentioned that both Thesleff and Stowe, through independent work, have administered succinylcholine to horses but did not state the number of horses or dose used in the experiments.

From the Department of Physiology, School of Veterinary Medicine, Colorado A. & M. College, Fort Collins.

The data herein are taken from a thesis submitted by Dr. Belling to the Graduate School, Colorado A. & M. College, Fort Collins, in partial fulfillment of the requirements for the degree of master of science in physiology, June, 1954, and are published with the approval of the dean of the Graduate School.

Acknowledgement is given to Dr. A. D. Rankin, professor and head of the Department of Physiology, for his invaluable suggestions in conducting the study.

METHODS AND MATERIALS

The 15 horses used for this study varied in age, breed, size, and sex. They were weighed before the experiments began. The succinylcholine was administered intravenously, intramuscularly, intrathoracically, and by continuous intravenous infusion. The injections were made rapidly. For the intravenous route, they started with a dose of 0.01 mg. per pound of body weight, increasing in increments of 0.01 mg. per pound until the respiratory musculature was paralyzed. The minimum effective intravenous dose for each horse was then increased threefold to twenty-two fold for the intramuscular and intrathoracic routes of injection until the toxic level was reached. The toxic level was defined as that dosage which paralyzed the respiratory muscles. A separate trial was made on each dose level with a minimum time of one hour between the intravenous injections and a minimum of two hours between injections by the other routes.

The succinylcholine chloride* used in this project consisted of 20 mg. per cubic centimeter for intravenous administration, and of 50 mg. per cubic centimeter for intramuscular and intrathoracic routes of injection. A 0.2 per cent solution of succinylcholine was used for the continuous infusion.

Drug effects were observed on the: (1) muscular system; (2) respiratory system; (3) cardiovascular system; and (4) nervous system.

Muscular System.—An arbitrary method of determining the muscle relaxation consisted of ascer-

taining the dosage as well as the length of time required to put the horse in a recumbent position and the ease of then flexing the front and rear limbs manually. In addition, the voluntary and asphyxial movements, the time at which the horse was able to arise unassisted, and the attitude assumed upon standing were also observed.

Respiratory System.—The respiratory rate was recorded prior to the administration of the drug; three and six minutes after the injection; and every two minutes thereafter for the duration of the effect. When respiratory failure occurred, the length of time required for artificial respiration by the technique described by Rankin *et al.*¹² was also recorded.

Cardiovascular System.—The heart rate was recorded prior to the administration of succinylcholine, three and six minutes after the injection, and every two minutes thereafter until recovery.

Blood pressure kymograms were obtained on 5 horses, using the method described by Booth and Rankin.¹ The horses were restrained, unanesthetized, on an operating table. A 2 per cent procaine hydrochloride solution was infiltrated around the facial artery at the point where it passes anterior to the masseter muscle. The facial artery then was cannulated and connected with mercury manometer which recorded the blood pressure on a Gorrell and Gorrell long paper kymograph. A 6 per cent sodium citrate solution was used in the manometer tubing to prevent the clotting of blood. In each instance, a control record was obtained prior to the administration of the drug, which was followed by a continuous intravenous infusion of a 0.2 per cent solution at the rate of approximately

* "Anectine" was supplied by Burroughs Wellcome and Co., Inc., Tuckahoe, N. Y.

TABLE I.—Intravenous Route of Injection of Succinylcholine Chloride in the Horse

| HORSE NO. | DOSE (MGN./LB.) | | | | | | | | | | | TIME DOWN FOLLOWING INJECTION IN SECONDS | DURATION OF EFFECT IN MINUTES AND SECONDS | DURATION OF ARTIFICIAL RESPIRATION IN SECONDS |
|--------------|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|---|--|--|
| | .02 | .03 | .04 | .05 | .06 | .07 | .08 | .09 | .10 | .15 | .2 | | | |
| 1 | X | 0 | | | | | | | | | | 20-23 | 240-252 | 48 |
| 2 | X | 0 | | | | | | | | | | 16-40 | 3139-8145 | 30 |
| 3 | 0 | | | | | | | | | | | 20 | 4:55 | 95 |
| 4 | | X | 0 | | | | | | | | | 60-70 | 3100-3135 | 75 |
| 5 | | | | | | | | | | | 0 | 53-70 | 3152-6120 | 75 |
| 6 | | | | | | X | X | 0 | | | | 35-85 | 3105-6110 | 35 |
| 7 | | X | X | X | X | X | X | 0 | | | | 20-35 | 1110-7155 | 20 |
| 8 | | X | 0 | | | | | | | | | 60-105 | 5147-11105 | 55 |
| 9 | | X | X | X | X | X | 0 | | | | | 50-83 | 0152-6115 | 30 |
| 10 | | 0 | | | | | | | | | | 16 | 3104 | 45 |
| 11 | | | | | | | X | 0 | | | | 100-110 | 3120-9105 | 60 |
| 12 | | | 0 | | | | | | | | | 25 | 12 | 75 |
| 13 | | | 0 | | | | | | | | | 21 | 3109 | 55 |
| 14 | | | | | | | X | X | 0 | | | 45-105 | 1150-5120 | 165 |
| 15 | | | X | X | X | X | X | X | 0 | | | 35-70 | 2135-11125 | 150 |

x=Dose level employed which produced recumbency without paralyzing respiration. o=Dose level which produced recumbency and paralyzed the respiratory musculature.

Note: In horses 3, 5, 10, 12, and 13, the minimum dose to produce recumbency also paralyzed respiration.

70 to 120 drops per minute. The recording was made to determine the effect of a relaxing dose on blood pressure, with and without paralysis of the respiratory muscles.

Nervous System.—The nervous system was stimulated in 5 horses which received the succinylcholine by continuous intravenous infusion to determine whether the drug was capable of blocking myoneural junctions. The status of myoneural junctions was tested by stimulating the skin over the shoulder and over the ulnar nerve (olecranon process) with an electrical stimulus of 250 volts at a frequency of 100 stimuli per second. The bipolar technique described by Howell¹³ was used to test the effectiveness of the myoneural junction block. If a local muscle contraction occurred, it was assumed that muscle fibers were being directly stimulated, but if generalized motor activity (other limbs than the one stimulated) occurred, it was assumed that sensory nerves were stimulated and spinal reflexes evoked. Any motor activity, other than from local stimulation, was accepted as evidence of functional myoneural junctions and of failure of the succinylcholine to effectively block the junction. The tests were made at three-minute intervals for thirty minutes.

EXPERIMENTAL RESULTS

Studies on the Dosage.—A dose level of 0.03 mg. per pound of body weight was found to be the minimum capable of producing recumbency by the intravenous route. The dose level for the same animal was nearly constant; however, variations among individuals existed. Table 1 sum-

marizes the dose levels employed, time of onset of action, and duration of action, as well as the time required for artificial respiration.

Four times the minimum effective intravenous dose was the minimum amount capable of producing recumbency with the intramuscular injection. The intramuscular injection was made in the gluteal region of the horse in each instance. This method of injection produced erratic results. In some instances, although a given dose would cause a horse to fall, an increased dose would be ineffective. Sometimes artificial respiration had to be repeated two or three times on an animal and the recovery time was more prolonged than with intravenous administration (table 2). One horse died by this method of administration (see discussion).

Six times the minimum effective intravenous dose was the minimum amount capable of producing recumbency with the intrathoracic route of injection (between the eighth and ninth ribs, an arbitrarily selected site). This route of injection produced variable results similar to the intramuscular route and was found to be unsatisfactory (table 3). One horse also died by this method of administration (see discussion).

In the intravenous infusion study, a pre-

TABLE 2—Intramuscular Route of Injection of Succinylcholine Chloride in the Horse

| HORSE NO. | DOSE (MG./LB.) | RECOGNITION | RESPIRATORY PARALYSIS | DOSE (DETERMINED BY INCREASING THE MINIMUM EFFECTIVE INTRAMUSCULAR DOSE LEVEL IN TABLE 1 FROM 3-62 TIMES) | | | | | | | | | | | | TIME DOWN FOLLOWING INJECTION (MINUTES & SECONDS) | DURATION OF EFFECT (MINUTES & SECONDS) | DURATION OF ARTIFICIAL RESPIRATION (MINUTES & SECONDS) | | | | | | |
|-----------|----------------|-------------|-----------------------|---|---|---|---|---|---|---|----|----|----|----|----|---|--|--|----|----|----|-------------|-------------|--------|
| | | | | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | |
| 1 | .12 | .57 | | | | | | | X | - | X | X | O | | | | | | | | | | | |
| 2 | .30 | .39 | | | | | | | X | X | X | O | | | | | | | | | | | | |
| 3 | .24 | .24 | | | | | | | O | | | | | | | | | | | | | | | |
| 4 | .24 | .28 | | | | | | X | O | | | | | | | | | | | | | | | |
| 5 | 1.6 | 1.6 | | | | | | | O | | | | | | | | | | | | | | | |
| 6 | .12 | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | .68 | .80 | | | | | | | | | | | | | | | | | | | | | | |
| 8 | .28 | .28 | | | | | | | O | | | | | | | | | | | | | | | |
| 9 | HORSE DIED | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | .21 | .66 | | | | | | | X | - | X | X | - | - | - | X | X | - | - | X | O | 01:25-09:45 | 07:15-05:50 | 02:09* |
| 11 | .48 | .48 | | | | | | | O | | | | | | | | | | | | | | | |
| 12 | .16 | .20 | X | O | | | | | | | | | | | | | | | | | | | | |
| 13 | .30 | .55 | | | | | | | X | - | X | X | X | O | | | | | | | | | | |
| 14 | .32 | .40 | X | O | | | | | | | | | | | | | | | | | | | | |
| 15 | .25 | .40 | | | | | | | X | X | X | O | | | | | | | | | | | | |

X= Dose level employed which produced recumbency without paralyzing respiration. O= Dose level which produced recumbency and paralyzed the respiratory musculature. —= Horse failed to assume a recumbent position. *Total elapsed time for artificial respiration. In these cases, artificial respiration was stopped and had to be applied a second and third time.

Note: In horses 3, 5, 8, and 11, the minimum dose to produce recumbency also paralyzed respiration.

liminary trial with 0.1 per cent solution of succinylcholine indicated that it was too weak. A 0.2 per cent solution at 70 to 120 drops per minute was satisfactory. The degree of relaxation could be easily controlled and if it appeared that respiration was being paralyzed, the infusion was briefly discontinued and recovery occurred without the use of artificial respiration.

Muscular System.—The muscular fasciculations seen in man appeared in the horse. They were usually constant in their appearance, seen first in the shoulder muscles and then extending back to the muscles of the gluteal region and the hind limbs. At times, they were observed in the intercostal muscles, but this was not constant. Also, a lowering of the head occurred in some animals at about the same time the muscle tremors appeared.

The horses usually took a step or two before falling, going down first on the hind quarters. Sometimes all four limbs collapsed causing the animal to fall straight to the ground. Regardless of the manner in which they fell, lateral recumbency was assumed. They went down easily in most cases with little risk of injury. On two occasions, when the horses fell straight to the ground, they dropped heavily. This resulted in temporary lameness which in both cases disappeared in twenty-four hours.

Respiratory System.—When respiration was paralyzed, the intercostal muscles were affected first, followed by the diaphragmatic muscles. Thus, some margin of safety was provided. The intercostal muscles have been paralyzed in some cases without apparent respiratory embarrassment. Asphyxial struggling was the guide used to determine the toxic level of this drug. In several instances, this struggling ceased before artificial respiration could be applied, but even so the toxic level was considered to be reached. Doses of succinylcholine causing partial or complete paralysis of the muscles of respiration were quickly and effectively combated with artificial respiration, which was continued until either diaphragmatic or thoracic respiratory movements were adequate. When artificial respiration was employed, it was not necessary to administer it more than two and three-fourths minutes, and 9 of the 15 horses required it for only a minute or less when the succinylcholine was administered intravenously.

Cardiovascular System.—There were changes in the heart and respiratory rate following the intravenous injection of succinylcholine. However, these slight-to-moderate increases and/or decreases in rate were not consistent. At no time were these changes considered important as they ap-

TABLE 3—Intrathoracic Route of Injection of Succinylcholine Chloride in the Horse

| HORSE NO. | DOSE (MG./LB.) | RECUMENT POSITION | RESPONSETIME (TOTAL TIME) | DOSE (DETERMINED BY INCREASING THE MINIMUM EFFECTIVE INTRAVENOUS DOSE LEVEL IN TABLE I FROM 3-22 TIMES) | | | | | | | | | | | | TIME DOWN FOLLOWING INJECTION (MINUTES & SECONDS) | DURATION OF EFFECT (MINUTES & SECONDS) | DURATION OF ARTIFICIAL RESPIRATION (MINUTES & SECONDS) | | | | | | |
|-----------|----------------|-------------------|---------------------------|---|---|---|---|---|---|---|----|----|----|----|----|---|--|--|-------------|-------------|-------------|-------|-------|-------------|
| | | | | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | |
| 1 | .36 | .36 | | | | | | | | | | | | | | | | | | | | 02:55 | 6:10 | 11:45 |
| 2 | .68 | .68 | | | | | | | | | | | | | | | | X X X X X X X O | 08:35-11:45 | 05:05-35:15 | HOME NEEDED | | | |
| 3 | .27 | .27 | | | | | | | | | | | | | | | | | | | | 05:30 | 08:00 | HOME NEEDED |
| 4 | .36 | .36 | | | | | | | | | | | | | | | | | | | | 05:15 | 13:05 | 08:10 |
| 5 | 1.6 | 1.6 | | | | | | | | | | | | | | | | | | | | 02:09 | 8:23 | 00:30 |
| 6 | HORSE DIED | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | .64 | .68 | | | | | | | | | | | | | | | | X X - X - - O | 00:30-16:20 | 10:05-13:37 | 01:14* | | | |
| 8 | .36 | .68 | | | | | | | | | | | | | | | | X - X X - X X O | 00:20-17:50 | 08:53-15:40 | 34:00 DIED | | | |
| 9 | HORSE DIED | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | .30 | .57 | | | | | | | | | | | | | | | | X X X - - X X X X O | 03:18-14:08 | 04:46-20:45 | 00:51 | | | |
| 11 | .56 | .72 | | | | | | | | | | | | | | | | X X O | 06:30-12:30 | 22:30-31:55 | 00:55 | | | |
| 12 | .36 | .50 | | | | | | | | | | | | | | | | X X | 04:15-07:20 | 06:15-18:12 | 01:00 | | | |
| 13 | .45 | .75 | | | | | | | | | | | | | | | | X - X - X X | 00:30-12:15 | 05:20-16:53 | 08:30 | | | |
| 14 | .48 | .72 | | | | | | | | | | | | | | | | X X X X | 03:45-15:00 | 08:15-9:00 | 07:00* | | | |
| 15 | .55 | | | | | | | | | | | | | | | | | X - X X HORSE DIED | 03:15-16:40 | 08:27-13:19 | | | | |

*=Dose level employed which produced recumbency without paralyzing respiration. o=Dose level which produced recumbency and paralyzed the respiratory musculature. —=Horse failed to assume a recumbent position. *Total elapsed time for artificial respiration. In these cases, artificial respiration was stopped and had to be applied a second and third time.

Note: In horses 1, 3, 4, and 5, the minimum dose to produce recumbency also paralyzed respiration.

parently had no deleterious effect on the animal.

Blood pressure tracings, taken on 5 horses, remained normal as long as the respiratory muscles were not impaired. As soon as partial or complete paralysis occurred, there was a significant rise in the blood pressure. When artificial respiration was employed, the blood pressure returned to normal levels immediately and remained there as long as ventilation, either natural or artificial, was adequate. As soon as asphyxia was alleviated, intravenous infusion could safely be continued at a slightly decreased rate. The rise in blood pressure following partial or complete paralysis of the respiratory muscles was assumed to have resulted from hypercapnia.

Neural Reflex Activity.—Succinylcholine blocked the ability of the animals to respond to electrical stimulation in trials on 5 animals. In 1 horse, it was necessary to paralyze the respiratory muscles, while the animal was maintained by artificial respiration, before reflex activity was abolished. In the remaining 4 animals, reflex activity was abolished without paralyzing the respiratory muscles.

DISCUSSION

The results obtained from this study indicate that succinylcholine is capable of abolishing the ability of skeletal muscle to respond to nerve impulses. These effects were obtained both with and without paralyzing the muscles of respiration. In this regard, succinylcholine appears to have a distinct advantage over curare.

Even though temporary lameness resulted in 2 horses, the dangers of injury to animals are probably less than with the usual method of casting horses by using chloral hydrate or a casting harness.

The asphyxial struggling seen by Booth and Rankin¹ in the horse when using curare, and by Bovet *et al.*² in the dog using succinylcholine, were seen in the horses of this experiment. The asphyxial struggling was relatively mild when compared to that seen while using curare. Perhaps this is related to the fact that succinylcholine appears to block the myoneural junction more effectively in the horse than does curare. Artificial respiration proved satisfactory in combatting respiratory paralysis and can be applied by one man if the horse's respiration has been paralyzed by succinyl-

choline, whereas this would be difficult under the same conditions with curare. Other methods were not attempted in this study because Castillo and deBeer³ reported that there are no other satisfactory antidotes for an overdose of succinylcholine.

The appearance of the peak action of the drug, when given intravenously, was variable, ranging from sixteen to 110 seconds. As a rule, the higher the dose level, the quicker the onset of action. However, in some cases, a higher dose level did not hasten the onset of action; and in some cases, it required a longer time for the peak action. The duration of action ranged from fifty-two seconds to fourteen minutes and, again, there was some variation because at times a smaller dose seemed to last longer than a higher dose. Nervousness or anxiety was not observed because of the rapid onset of action of the drug.

Muscular fasciculations can be prevented in man by using a slower injection.⁴ However, the appearance of the fasciculations gives an indication of what is going to happen and can be a valuable guide in determining when the horse is going to fall.

In the intramuscular and intrathoracic routes of injection, the dose necessary, the time of the onset, and the duration of action are extremely variable. In the 2 horses which died, 1 from an intrathoracic and 1 from an intramuscular injection, the reactions were identical. No reasons for the deaths were indicated by the necropsies, so it was assumed that central depression of the respiratory center was responsible. This central nervous system depression has been reported by Little *et al.*¹⁴ and also by Ellis *et al.*⁵ Because of the inconsistent results from these two routes of injection, they are not recommended.

The rapid detoxification of the drug, the short duration of paralysis of the respiratory muscles, and the ease with which artificial respiration can be given, make this drug valuable to the veterinarian. However, it should not be used without having available a means of administering artificial respiration. In the event a horse does not fall from the first dose, since the drug has no cumulative action, it is necessary to wait only a few minutes before another injection of a larger dose can be made. The fasciculations that appear provide a useful guide for adjusting the dose.

SUMMARY

1) The action of succinylcholine on several physiological activities was observed in 15 horses.

2) The dose range varied from 0.03 to 0.09 mg. per pound of body weight. This variation should not hinder its application if a satisfactory means of artificial respiration is available.

3) Succinylcholine was capable of abolishing the reaction to spinal reflex activity in the horse.

4) Blood pressure studies showed that succinylcholine had no direct effect on blood pressure.

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Succinylcholine in the Placement of Hip Joint Prosthesis

In human surgery, succinylcholine chloride is a potent but safe relaxing agent for use in the operative replacement of an upper femoral prosthesis. With a prosthesis which restores the full length of the femoral neck, difficulty is frequently experienced in replacing the head in the acetabulum without a greater detachment of muscles than is desirable. Accidents such as splitting the upper femoral shaft or crushing the superior acetabular wall have occurred.

In a series of tests with succinylcholine chloride, the patient was carried under light anesthesia until the prosthesis was properly seated in the end of the femur. The assistants then were ready—one to provide the traction and manipulation on the extremity of the limb, the other to apply countertraction with a sheet looped through the groin, and the operator, with a bone skid to use as a guide, was ready to manipulate the prosthesis into the acetabulum. The anesthetist then injected succinylcholine intravenously and as soon as total relaxation occurred the reduction of the

hip was easily effected in every case. The stability of the reduction should not be tested by adducting or rotating the extremity until the relaxing effect of the drug has disappeared, which usually requires three to five minutes.—*Am. J. Surg.*, Aug., 1954.

U. S. Livestock Sanitary Association 1954 Meeting

The fifty-eighth annual meeting of the U. S. Livestock Sanitary Association was held in the Hotel Fontanelle, Omaha, Neb., Nov. 10-12, 1954. Dr. T. C. Green, state veterinarian of West Virginia, presided. The officers elected for the next year were: Drs. H. F. Wilkins, Helena, Mont., president; A. L. Brueckner, Baltimore, Md., first vice-president; G. H. Good, Cheyenne, Wyo., second vice-president; J. G. Milligan, Montgomery, Ala., third vice-president; and R. A. Hendershott, Trenton, N. J., secretary-treasurer. The 1955 meeting will be held in the Jung Hotel, New Orleans, Nov. 16-18, 1955. Omaha, which was celebrating its centennial anniversary, was an excellent host city.

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President's Address.—Mentioned by the president as requiring attention by the U.S.L.S.A. were the eradication of bovine tuberculosis and brucellosis, the former because the disease seemed to be increasing in some areas and because a complacent attitude has resulted in some careless testing. Regarding brucellosis, unless the vaccine is controlled, unscrupulous owners of many cheap cows may cause them to react and thus qualify for indemnity. State officials were commended for their part in controlling vesicular exanthema by having garbage-cooking laws so uniformly adopted. Attention was also directed to the salebar problem; not only do they spread disease intrastate but those along state boundaries often are able to avoid interstate regulations.—*T. C. Green, D.V.M., State Veterinarian, West Virginia*.

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Tuberculosis (Committee Report).—The following measures were recommended to speed the eradication of bovine tuberculosis: (1) enlist the aid of the extension services, state veterinary medical associations, and livestock associations, and place more emphasis on instructing veterinary students on the importance of the test and in the testing technique; (2) improve identifications so that animals found to be tuberculous can be traced and the source herd-tested; (3) test the swine and poultry on farms where they might be a factor; (4) test members of the families on the involved farms; and (5) that all health agencies cooperate

in enforcing the prevailing minimum rules for the eradication of tuberculosis.—*H. A. Milo, D.V.M., Chairman, Pennsylvania*.

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Biological and Pharmaceutical Products (Committee Report).—The committee recommended: (1) a review by state officials of regulations for accepting, as immunized, swine vaccinated with the new hog cholera vaccines; (2) discontinuance of the liquid brucella (strain 19) vaccine; and (3) an attempt be made to curb the sale of certain poultry vaccines which avoid federal regulations by intrastate sales only.—*M. Welsh, D.V.M., Chairman, Indiana*.

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Atrophic Rhinitis in Swine.—More than one agent may be responsible. Evaluating its "stunting" effect is difficult because of the frequent presence of associated infections. Early spring pigs seem to be affected more than the late spring crop. A 30-foot lane between hoglots checks its spread. The establishing of disease-free herds as a source of breeding animals is recommended.—*W. P. Switzer, D.V.M., Iowa*.

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Leptospirosis in Swine.—A survey by random blood tests indicated that about 33 per cent of the swine and 3.8 per cent of the cattle in Ohio may have been affected. (In one Middlewest survey, 22 per cent of swine were positive.) Sows infected before breeding usually do not abort. The spread of infection in urine might be controlled by feeding so as to lower the pH of the latter. The organism may multiply in surface water and be carried by streams.—*E. H. Bohl, D.V.M., Ohio*.

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Swine Diseases (Committee Report).—Reports from 46 states and Canada indicate the following occurrence of swine diseases in 1954:

Hog Cholera.—No state reported an increase; 22 states (4 major producers) reported less; 20 states reported no change; Canada reported none.

Swine Erysipelas.—This disease increased materially; 15 states (5 major) reported more; 6 (all minor producers) reported less; 6 reported none; Canada reported frequent occurrence.

Atrophic Rhinitis.—This disease has continued to spread, with 9 states (3 major) reporting more, 3 states (2 major) and Canada reporting less, and 8 states reporting none.

Leptospirosis.—This disease is difficult to recognize; 5 states (2 major) reported more, 1 reported less, others were uncertain, and Canada reported none.

Transmissible Gastroenteritis.—One state reported an increase, 5 (2 major) reported less, and 12 states and Canada reported none.

Enteritis Complex.—Two states (both minor producers) reported more and 10 (4 major) reported less.

Respiratory Diseases.—Three states reported more, 7 (2 major) reported less, and Canada reported a few new cases.

A few states reported swine enterotoxemia

(edema disease), eperythrozoonosis, anthrax, and parakeratosis.

Cholera postvaccination reactions decreased, which was perhaps due to the more extensive use of modified vaccines, especially when used with serum. The decrease in hog cholera was perhaps due to the diminishing use of virulent virus. The problem of immunity failures should be studied.

Erysipelas prophylaxis, by using culture and antiserum in gilts before breeding and in their pigs after being weaned, was recommended for the states (26) where culture is available. The new bacterin should not be expected to produce a lasting immunity. The large demand for erysipelas antiserum created a shortage. The feeding of antibiotics may be partly responsible for the decrease in enteritis and respiratory diseases.

The rehabilitation of the Swine Disease Research Institute near Ames, Iowa, was recommended.—*J. D. Ray, D.V.M., Chairman, Illinois.*

The Incidence of Anthrax.—In the first two quarters of 1954, anthrax was relatively rare but an unusual occurrence in nonanthrax areas in the swampy Mississippi River delta in extreme southeastern Louisiana and the southwestern county of Mississippi caused heavy losses later. By contrast, the heavy losses in 1952 were in the first six months, mostly in swine in nonanthrax areas (infected bone meal) and in cattle and horses in Kansas and New Jersey following vaccinating with bacterin.—*C. D. Stein, D.V.M., Washington, D.C.*

Infectious Diseases of Cattle (Committee Report).—Virus diarrhea, first reported in New York in 1946, has been diagnosed in recent years in Illinois, Wisconsin, and Indiana and probably the "mucosal disease" reported in Iowa is the same disease but with a higher mortality. Usually the morbidity is high, the mortality relatively low. A diagnosis of bovine leptospirosis made on the basis of a low titer reaction is not justified. For its control, the avoidance of contact with swine and the isolation of new animals is recommended. Mastitis remains the major disease of dairy cows.—*S. H. McNutt, D.V.M., Chairman, Wisconsin.*

Animal Disease Control and Eradication.—The Agricultural Research Service of the U.S.D.A. employs about 1,340 veterinarians compared to 1,500 in 1950; more are needed. New cooperative ventures being tried include: one veterinarian to serve as both the state and federal sanitary official (in South Carolina and Wisconsin) and all regulatory activities in a given area within a state to be supervised by one federal veterinarian. Congress has authorized \$15 million per year for the next two years to expand the brucellosis control program.

Scrapie, which first occurred in Michigan in 1947, has appeared and been eliminated in seven states and descendants of animals in affected flocks

have been traced to 576 flocks in 39 states. These flocks are under surveillance.

Bluetongue has recently been clinically diagnosed in Colorado, Oklahoma, Kansas, Nebraska, and Missouri to bring the total to 11 affected southwestern states. The federal laboratory at Denver has been designated as the official laboratory for the diagnosis of bluetongue.—*C. D. Van Houweling, D.V.M., Washington, D. C.*

Hog Cholera Eradication at the County Level.—Suwannee County in northern Florida was selected for this experiment. The first stage, education, is well under way, meetings being held with civic, farm, and veterinary groups. Approximately 80,000 swine are raised annually in this county. In 1953, 50 per cent were vaccinated and many herds were affected with cholera. In 1954, although the program was not yet effective, there was very little cholera.—*C. L. Campbell, D.V.M., Florida.*

Vesicular Stomatitis.—Swine have been considered less susceptible to V.S. than cattle and horses, yet in the past three summers many swine in five southern states (Virginia, North Carolina, Georgia, Florida, Louisiana) have been affected while cases in exposed cattle, horses, and mules were rare. The virus was the New Jersey type. Garbage-feeding was not a factor. In 1943, vesicular stomatitis appeared in swine hyperimmunized for cholera in Missouri, so contaminated hog cholera virus might spread the disease. Insect vectors are a possibility; the disease disappears after a killing frost. Rats are susceptible and may be vectors.—*H. W. Schoening, D.V.M., U.S.D.A.*

Vesicular Diseases (Committee Report).—After studying foot-and-mouth disease in Europe and South America, a British commission decided that when all factors and cost are considered, it is much more practical to eradicate the disease than to attempt its control by vaccination and quarantine.

Vesicular exanthema, in the past twelve months, has appeared in Michigan, Illinois, Iowa, Arkansas, and for the first time in Louisiana, but in each case it was quickly eradicated. The source of these infections remains a mystery. Of the nation's 12,000 garbage-feeding premises, 83 per cent are cooking the garbage and 89 per cent are being inspected semimonthly. However, since many big feeders in California, New Jersey, Massachusetts, and Texas are feeding raw garbage, only about 65 per cent of the garbage fed is cooked.—*F. J. Mulherin, D.V.M., U.S.D.A.*

Rabies Control in New York State.—Brain tissue rabies vaccine was used on 465,000 dogs from 1946 to 1951; avianized vaccine on 250,000 dogs since 1950. Both immunize satisfactorily, 38 cases being diagnosed as rabies more than four months after vaccination with the former, and 2 cases with the latter vaccine. The state now offers

the counties the choice of vaccinating annually with the brain tissue vaccine or every four years with the avianized vaccine. While postvaccinational paralysis has not been satisfactorily evaluated, it has not occurred with the avianized vaccine. There has been no evidence of a reversion to virulence of the latter.—*D. J. Dean, D.V.M., New York.*

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Animal Disease Research.—This country is still dedicated to living without disease. In the past century the tick fever area expanded only about 2 miles per year; now quarantines are harder to maintain and disease can cross the continent in a few days.

Controlling one disease often spreads another; when the tick fever quarantines were lifted and cattle were shipped, they carried *Ostertagia* parasites to new areas; likewise when reacting animals are marketed their replacements may bring in new diseases. Losses from the shipping fever complex have increased until it may cost the feeder an average of \$10 to \$50 for every steer put in his feedlot. Mild, subclinical infections may cause greater losses than apparent diseases. In disease control, "we must not play a defensive game. We punted on first down for twenty years against vesicular exanthema, then nearly lost."—*B. T. Simms, D.V.M., U.S.D.A.*

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Annual Morbidity and Mortality Reporting.—As the livestock population in an area doubles, losses often quadruple. Annual livestock losses, including poultry, total about \$2.6 billion. The questionnaire method of gathering information, started in 1953, has met with variable cooperation. Fairly accurate information is available on reportable diseases such as rabies, anthrax, vesicular exanthema, scrapie, and others. More comprehensive reports are needed.—*M. R. Clarkson, D.V.M., U.S.D.A.*

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Brucellosis Eradication.—This campaign was started nearly twenty years ago as a cattle-reduction program. The next few years should greatly expand the nation's brucellosis-free areas. Vaccination with strain 19 should be increased but should be confined to calves except in emergencies.—*A. K. Kuttler, D.V.M., U.S.D.A.*

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Control of Brucellosis in Range Areas.—Diseases spread slowly under range conditions but in 1929, when all heifers on one range were rounded up to calve, 66 per cent lost their calves. They were then turned out and eventually mingled with cattle bearing 40 or more other brands. Since using the new vaccine (1938), over 85 per cent of their calf crops have been saved. In 1953, as a check, about 20 per cent of the older cattle of the 91,000 in that county were tested; 438 reacted, 138 in one herd. The county, which soon will be accredited, is long on cows and short on taxpayers so spending tax money on vaccination is not favored. Vaccinating calves 4 to 8 months old is

not practical as they usually are not rounded up until about 9 months old. Furthermore, not over 1 per cent of range heifers become sexually mature before 1 year of age.—*F. S. Brenner (Raucher), Montana.*

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Swine Brucellosis (Committee Report).—In 1949, two states set up a swine brucellosis-free accredited herd program; now 13 states, six in the cornbelt, have such programs. Eight states require a clean test for importation.—*J. R. Hay, D.V.M., Chairman, Ohio.*

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Cattle Scabies in 1954.—Psoroptic mange, virtually eradicated in 1935, reappeared in 1946 and was again eliminated. In January, 1954, extensive infection was found in Arizona in steers imported in October, 1953, from Colorado. Later infection was found in California, Missouri, Oklahoma, and Texas in animals from the same Colorado area. Dipping is more practical than spraying, except for small herds. BHC or lindane solutions are preferred. (If sheep are treated in cold weather keep them moving until dry—if they lie down they may freeze to the ground.)—*H. E. Kemper, D.V.M., U.S.D.A.*

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Parasitic Diseases (Committee Report).—Few animals are free of internal parasites, the younger being most heavily infected. The estimated losses, including those from unthriftness, reduced resistance to infection, and the cost of drugs used in attempts to control internal parasites is about \$430 million; external parasites, \$500 million; total, \$930 million or about one third of all livestock losses.—*B. Schwartz, Ph.D., Chairman, U.S.D.A.*

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New York State Mastitis Control.—Mastitis can be eliminated from many herds by: (1) proper use of milking machines; (2) cooperation between the herdsmen and veterinarian; (3) dipping or wiping the end of the teat with alcohol after milking; and (4) sanitation. Milking time, usually two to five minutes per cow, averages 3.3 minutes. Concrete walks for the cows help to reduce the dirt carried into dairy barns.—*H. G. Hodges, D.V.M., New York.*

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Factors that Influence the Isolation and Growth of Brucella.—Routine methods of culturing do not produce growth of certain strains of *Brucella*. Altering the medium by the addition of certain chemicals or killed microorganisms allows these strains to grow even if present only in small numbers. This should make it possible to avoid repeated venipunctures in order to isolate the organism from a brucellosis patient.—*I. Forrest Huddleston, D.V.M., Michigan.*

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Public Health (Committee Report).—A nationwide poultry inspection program is needed. Human cases of psittacosis averaged less than 25 an-

nually until 1952 but more than 400 cases were reported up to Nov. 1, 1954. Many of these were in Texas where the disease (ornithosis) seems widespread in turkeys. There seems to be no danger to the consumer of these birds but more attention must be paid to the interstate shipment of live birds.—*W. L. Bendix, D.V.M., Chairman, Virginia.*

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Bluetongue.—This disease, diagnosed in 1948 as "sore muzzle," now is believed to have been in Texas for perhaps twenty years. It is estimated to cost the sheep industry of Texas at least a half million dollars annually. Ten strains of the virus are recognized in Africa. The commercial vaccine available here includes only the two strains found in California. A more multivalent vaccine may be needed. In one outbreak, Culicoides species (gnats) were not present so mosquitoes were suspected of being the vectors. However, only when the latter were macerated and injected could the disease be reproduced (9 days postinoculation). In Africa, the vaccination of lambs is not successful (they apparently are fairly resistant) which suggests that some of the "stiff lamb disease" may be a mild form of bluetongue. The use of sprays to control insect vectors offers the best possibility of protecting lambs.—*Donald A. Price, D.V.M., Texas.*

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A New Virus-Like Disease of Cattle.—In California a respiratory disease of cattle, either a new or clinically qualified one, appeared in 1953 (see JOURNAL Dec., 1954: 473-474). Its rapid spread in affected herds suggested marked contagiousness yet it appeared in a few isolated herds. An experiment with calves during the outbreak indicated that the disease was readily transmitted. However, these results could not be reproduced later by the authors. Although diarrhea rarely occurred, the possibility that it was "virus diarrhea" was eliminated by tests. It is suggested that either: (1) it is not infectious; (2) it is infectious but not readily transmissible; or (3) the experimental subjects were already immune.—*D. E. Jasper, D.V.M., California.*

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Exotic Diseases (Committee Report).—A new text on exotic diseases prepared for regulatory officials and practitioners is soon to be released. Recent experiences with such diseases as scrapie and bluetongue indicate the importance of keeping up-to-date on such.—*F. A. Todd, D.V.M., Chairman, U.S.D.A.*

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Evaluation of Poultry Vaccines.—The cooperation of state, federal, and commercial agencies is necessary for the continued improvement of poultry vaccines. Federal agencies should have larger staffs to evaluate vaccines.—*R. P. Hanson, D.V.M., Texas.*

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Equine Encephalitis (Eastern Type).—This dis-

ease in pheasants was reported to be present annually in New Jersey. Nine outbreaks were reported in the past two years.—*F. R. Beaudette, D.V.M., New Jersey.*

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Anaplasmosis (Committee Report).—Anaplasmosis can be transmitted by the tick and passed via the egg to succeeding generations. It may be carried in ticks for as long as eight years. Flies carry the infection on their mouth parts but for no longer than five minutes. Field investigations of anaplasmosis are indicated and more diagnostic facilities should be established.—*A. L. Brueckner, D.V.M., Chairman, Maryland.*

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Vesicular Exanthema Experiments.—Meat scraps from intravenously infected pigs slaughtered up to seven days after inoculation produced lesions or immunity when fed to susceptible pigs. The pigs showed lesions at forty-eight hours and their meat was infective for about 120 hours after vesication. The viremia period of intravenously exposed swine is about seventy-two hours, ending thirty-six hours after vesication. For the most part, virus transmission by direct contact follows the period of viremia, beginning just prior to vesication and continuing for about 108 hours, due to the fact that the virus is eliminated from the vesicles. A change in dosage altered the time of vesication but had no effect on the period of viremia.

There appears to be a marked difference in the pattern of viremia in intradermally exposed swine as compared with those intravenously exposed. Additional work is needed to confirm this observation.

Feeding meat scraps from swine convalescing from vesicular exanthema at fourteen days and at one month failed to infect susceptible test pigs.—*W. C. Patterson, D.V.M., U.S.D.A.*

Can Phenothiazine Depress Horses?

When a breeder of Thoroughbred horses noticed that they were not running well, and that his yearlings seemed to play less than they should, the prophylactic feeding of phenothiazine for three weeks of each month was discontinued. It was replaced with therapeutic doses given by stomach tube at six-week intervals. Soon the colts looked brighter and were playing as usual. [This may have been just a coincidence.]—*The Blood Horse, Nov. 13, 1954.*

Horsepower on United States Farms.—The horsepower on farms in the United States totals 115,672,000 but it consists of tractors, trucks, electric motors, and stationary engines. In comparison, factories in this country used 28,800,000 horsepower.—*Country Gentleman, Nov., 1954.*

Auricular Fibrillation in Horses

D. K. DETWEILER, V.D.M., M.S.

Philadelphia, Pennsylvania

THE AUTHOR recently reported 5 cases of auricular fibrillation in horses and reviewed the literature available to him at that time.¹ This is a report of an additional case, and a report from Holland,² previously overlooked, is reviewed.

In van Zijl's paper,² it is stated that during the last twenty years 60 cases of auricular fibrillation or auricular flutter³ were found in the collection of 400 horse electrocardiograms accumulated in the Department of Veterinary Physiology of the University of Utrecht. Van Zijl points out that these figures can not be considered as truly representing the incidence of the condition since some of the records were from horses which did not have heart disease while others were known to have auricular fibrillation at the time the electrocardiograms were taken. Thus, valid data are still not available on the incidence of this arrhythmia in horses. Including van Zijl's cases,² the one to be reported herein, and those reviewed previously,¹ the number of cases reported comes to at least 105, discounting those published in journals unavailable to the author.

A series of cases have been found in several veterinary clinics where routine electrocardiograms are taken. Detweiler¹ found 5 cases in 2,018 horses examined in the veterinary clinic of the University of Pennsylvania; Roos⁴ encountered 4 during one year in private practice; Wirth⁵ diagnosed 8 in one year at the clinic of the Veterinary School of Vienna; Donald and Elliot⁶ discovered 5 in a random series of 130 horses; and Nörr's⁷ series of 40 cases of abnormal arrhythmias (excluding 60 cases of heart block, many of which were not truly abnormal) included 6 cases of auricular fibrillation.

CASE REPORT

Clinical Observations.—In June, 1953, an 11-year-old Thoroughbred gelding, a hunter and show horse, was given tetanus antitoxin in the pectoral region following a minor injury. Later, a swelling at the site of this injection led to an examination of the heart.

Dr. Detweiler is associate professor of pharmacology at the School of Veterinary Medicine, University of Pennsylvania, Philadelphia.

*Auricular flutter is much less common than auricular fibrillation and the term flutter-fibrillation has been used in the literature.^{3,4} Apparently most of the cases reported have been true auricular fibrillation, although at least one published record⁵ shows an instance of auricular flutter. In the present tabulation, all cases reported have been included although at least a few of them were instances of auricular flutter.

A loud murmur and "thrill" were present over the cardiac region and the heart rhythm was irregular. The horse, otherwise in good condition, was given a rest for several months followed by gradual resumption of training in January, 1954. The horse seemed less eager for work than in previous years and, since the heart rhythm remained irregular, the attending veterinarian suggested a cardiac examination.

On Feb. 2, 1954, this was carried out. The horse was apparently in excellent health, and his appetite, fecal elimination, and ability to perform moderate work, including jumping, were normal. On palpation, a distinct prolonged "thrill" was felt over the cardiac apex and on auscultation a harsh systolic murmur, most intense at the cardiac apex, was audible over the left and right cardiac areas. The first heart sound, which was fairly distinct, was followed immediately by a systolic murmur which continued throughout systole and fused with the second heart sound so that the latter was not clear-cut (fig. 1). A prolonged third heart sound was present. The area of cardiac dullness, as determined by percussion, was increased beyond normal limits as defined by Marek and Mocsy,⁷ indicating gross enlargement of the heart. An electrocardiogram was taken at rest and following exercise (fig. 2). The data are presented in table 1. A diagnosis of insufficiency of the mitral valve with auricular fibrillation and cardiac enlargement was made. Although there was no evidence of congestive heart failure as yet, the animal would have been dangerous to ride, so euthanasia was recommended.

However, the horse was kept at rest for five months, until transient edema of the hind legs and prepuce began to appear and for five weeks his appetite and weight had been diminishing. On reexamination, July 9, the clinical signs found previously were all present, as well as a slight edema of the prepuce. The jugular vein was distended to the ramus of the mandible with the head in normal position and the jugular pulse was exaggerated during systole. An electrocardiogram (table 1) reconfirmed the pres-

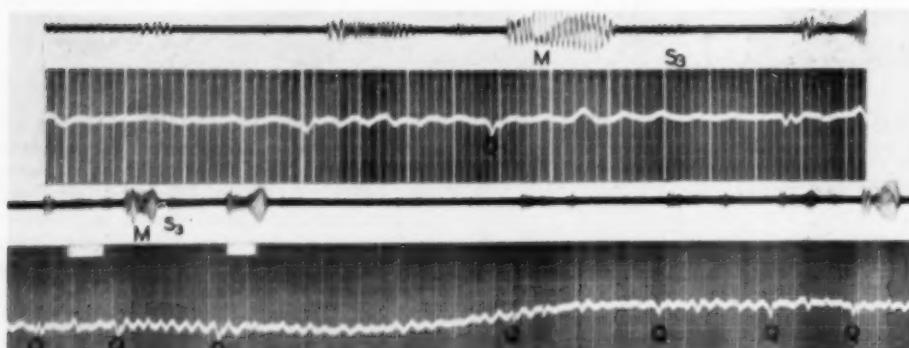


Fig. 1—Phonocardiograms and electrocardiograms of horse (lead II) taken on Feb. 2, 1954. The microphone was placed at the region of the cardiac apex. The upper record is at high speed (75 mm./sec.) and the lower at low speed (25 mm./sec.). M, systolic murmur; S₃, third heart sound; Q, QRS. Notice the variation in intensity of the heart sounds from beat to beat; this is characteristic in irregular heart action.

ence of auricular fibrillation, so the horse was destroyed.

Postmortem Examination.—The blood was pale, watery, and slow to clot. The abdominal cavity contained about 12 liters of serosanguineous fluid. The liver was enlarged, weighing about 18 kg., with a markedly roughened and pitted, grayish surface. The cut surface was dark purple, in some areas almost black, and the liver lobules were unduly distinct (nutmeg liver). The perirenal tissue was edematous. Many reddish black, pin-head sized areas were scattered through the cortex and medulla and on the surface of the kidneys.

The heart was greatly enlarged, with marked dilatation of both atria and some enlargement of the ventricles. The measurements (table 2) were taken according to the method used by Quiring and Baker⁸ and compared with maximum values given by

them. The surface area of the base of the heart was almost double the maximum size found in a series of normal equine hearts and the surface area of the ventricles was greater than the maximum given by Quiring and Baker. The total weight of the heart was also greater than normal, indicating hypertrophy. From these values, the great dilatation of the auricles can be appreciated and correlated with the disturbance of auricular function. Evidently both atrioventricular valves were incompetent, and intra-auricular pressure was greatly increased. With the ventricular surface greater than anticipated in a horse of this size, and the ventricular walls not thinned, some ventricular hypertrophy must have occurred. A similar hypertrophy was evident in the auricular myocardium. The relatively great total surface area of this heart is not reflected by a similarly large K value,

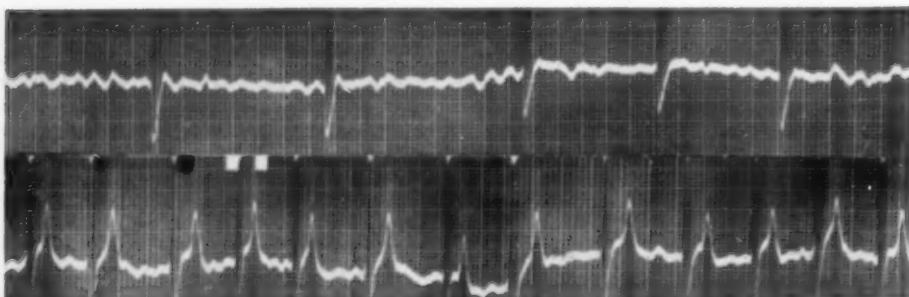


Fig. 2—Electrocardiograms of horse taken before (upper record) and after (lower record) exercise. The upper record is lead CR (apex) and the lower lead K (see footnote, table I).

TABLE I—Values from Electrocardiograms of Horse, Taken at Rest and Following Exercise

| Date | | | Average ventricular rate/min. | Average f-wave rate/min. | QRS (sec.) | QT (sec.) average |
|--------|-----------------|----------|-------------------------------|--------------------------|------------|-------------------|
| 2/2/54 | before exercise | CR apex* | 45 | 375 | 0.12 | 0.46 (var.) |
| | after exercise | K** | 104 | 500 | 0.09 | 0.27 (var.) |
| 7/9/54 | | CR apex | 58 | 350 | 0.12 | 0.34 (var.) |

*In this bipolar lead, the right arm electrode is attached to the right foreleg and the left arm electrode over the cardiac apex.

**This is a bipolar lead with one electrode (left arm) over the cardiac apex and the other electrode (right arm) just below the withers at the sixth intercostal space.

var. = variable.

therefore, it is clear that dilatation and hypertrophy were about equal in magnitude and perhaps had developed simultaneously. The endocardium of both atrioventricular valves and of both auricles showed irregular, grayish opaque streaks. The left atrioventricular valve was noticeably roughened.

Histological sections of various tissues exhibited the following pathological changes: liver, chronic congestion and cirrhosis; kidney, nephrosis; heart, cloudy swelling; atrioventricular valves, fibrosis.

The postmortem diagnosis was cardiac dilatation, hepatic cirrhosis, and ascites.

DISCUSSION

Although the incidence of auricular fibrillation in horses can only be conjectured, the conclusion that it often goes unrecognized clinically is warranted. It rarely develops except in serious heart disease, and, since horses with this arrhythmia may be subject to syncope, the imperativeness of adequate warning to owners and trainers is clear. In one of the cases previously re-

ported (case 3)¹ the horse apparently was permitted to enter a race, and in the case just described the animal was being trained over jumps at obvious risk to the rider's safety.

Auricular fibrillation, like other abnormal arrhythmias, may develop under various circumstances and its significance depends on the severity of the underlying heart condition. It can develop transiently, in apparently otherwise normal hearts, then disappear completely (case 4).¹ The diagnosis of auricular fibrillation should never be considered as complete, since the arrhythmia is only a manifestation of some underlying cardiac abnormality. It is usually associated with serious heart disease so should be considered a grave prognostic sign. Despite this, several cases have been reported in which the horse continued to perform useful work in the presence of the arrhythmia.

Clinical diagnosis of auricular fibrillation, without the aid of an electrocardiogram, may be based on the following criteria: (1) an absolutely irregular heart rhythm, a series of rapid beats succeeded by pauses of varying duration which, in some cases, may last up to ten or fifteen seconds; (2) an elevated heart rate—however, in a few reported instances marked bradycardia, as low as 15 beats per minute has been encountered; (3) a "pulse deficit," meaning a pulse rate which is slower than the audible heart beats, some contractions having occurred before the ventricles have filled with sufficient blood to produce a palpable pulse†; (4) occasional absence of the second heart sound, indicating insufficient blood in the ventricles at systole to open the pulmonary and aortic valves; (5) absence of an audible auricular heart sound since the auricles are not contracting, whereas when the ventricles alone fail to contract, as in

TABLE 2—Measurements of Heart After the Method of Quiring and Baker²

| Measurement | Value | Maximum values for Thoroughbred hearts given by Quiring and Baker** |
|---|------------------------|---|
| Fresh weight | 7,100 Gm. | 5,250 Gm. |
| Dry weight | 6,400 Gm. | 4,536 Gm. |
| Surface area of ventricles | 1,176 cm. ² | 1,209 cm. ² |
| Surface area of base | 1,074 cm. ² | 945 cm. ² |
| Total surface area | 2,250 cm. ² | 1,724 cm. ² |
| K ^o | 6.53 | 7.10 |
| Thickness of right ventricle | 2.7 cm. | 2.0 cm. |
| Thickness of left ventricle | 4.5 cm. | 5.4 cm. |
| Thickness of right ventricle and papillary muscle | 3.5 cm. | 3.8 cm. |
| Thickness of left ventricle and papillary muscle | 5.5 cm. | 6.3 cm. |

S

**K = $\frac{S}{W^{2/3}}$, where S is the surface area of the heart in cm.² and W is the weight of the heart in grams.

**These values are the maximum for any given measurement and are therefore taken from several different hearts. Thus the value for K was not calculated from data in the chart.

†This will diminish, or may even not occur, when the ventricular rate is very slow.

partial heart block, the auricular sound is audible in some horses**; (6) a pulse varying in force from beat to beat; (7) heart sounds and any audible murmurs varying in intensity from beat to beat.

In man, the treatment of auricular fibrillation is usually based on quinidine sulfate and digitalis. In cases of long standing, and when congestive heart failure is present, digitalis is administered to slow the ventricular rate and thus effect compensation. Quinidine sulfate or drugs with similar action may then be used in an attempt to abolish the arrhythmia. In cases uncomplicated by congestive heart failure, quinidine may be used initially. Sufficient data are not available for evaluation of medical treatment of this arrhythmia in horses. In the veterinary clinic of the University of Pennsylvania, 2 horses have been treated with quinidine sulfate.¹ The arrhythmia was abolished in both, but while 1 animal remained improved, the other improved only temporarily and died of congestive heart failure nine days later even though the arrhythmia did not recur. In each case, a total of 90 Gm. of quinidine sulfate was administered orally in nine 10-Gm. doses given one hour apart. Quinidine is a cardiac depressant and, therefore, dangerous to employ in the presence of congestive heart failure unless the failure can be attributed largely to the arrhythmia.

In the case reported in this paper, the horse was not considered a suitable patient for quinidine therapy because of the evident cardiac enlargement and the nature of the animal's work. Even though the arrhythmia might have been abolished, the underlying heart condition was too serious to permit use of the animal as a hunter or jumper. Had he been doing light work and not a riding horse, the only danger in attempting to abolish the arrhythmia would have been the possibility of causing congestive heart failure owing to the cardiac depressant action of quinidine. However, experience with this drug in dogs with auricular fibrillation indicates that even when congestive

heart failure is precipitated it is transient and disappears when the medication is stopped.

SUMMARY

1) A new case of auricular fibrillation in the horse is described.

2) The clinical significance of this disorder, especially in a riding horse, is discussed and the importance of correct diagnosis emphasized.

3) Criteria for the clinical diagnosis of auricular fibrillation in horses without the aid of an electrocardiogram are presented.

4) Therapy with quinidine sulfate is briefly discussed.

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ACTH for Equine Laminitis

A 12-year-old pony with typical laminitis affecting all four feet had a temperature of 104.5 F., pulse 84, and considerable heat in its feet. It was placed in a stall bedded with peat moss, its shoes were removed, and 50 I. U. of ACTH was injected intramuscularly in the neck. In twenty-four hours the temperature and respiration were normal, the heat in its feet had subsided, and it moved freely. At this time 20 I. U. of ACTH was injected and in another twenty-four hours the pony was normal and remained so.—*Vet. Rec.*, Oct. 9, 1954.

Chronic exposure to carbon tetrachloride, a solvent, detergent, and fire extinguisher, can result in aplastic anemia.—*J.A.M.A.*, June 19, 1954.

**In partial atrioventricular block in horses (as well as other species) the ventricles fail to contract at intervals. This occurs because the impulse from the auricles is not conducted to the ventricles. When this happens the auricles contract but ventricular contraction does not follow. At the time of this isolated auricular contraction a muffled sound may be heard in some cases. When this sound is heard the diagnosis of partial atrioventricular block is confirmed.

What Is Your Diagnosis?

Radiograph Offered for Your Study and Diagnosis

Because of the interest in veterinary radiology, the JOURNAL publishes this month, and will continue to do so for the next several issues, a case history and accompanying radiographs depicting a diagnostic problem.

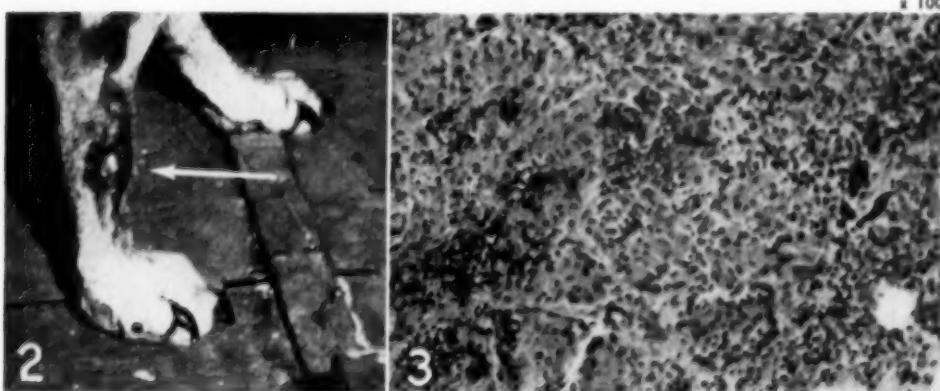
Make your diagnosis from the picture below — then turn the page ▶



History—Several scattered nodules were seen on the skin of a middle-aged, male hound. Over a period of six months the number of lesions had increased. The nodules were slow-growing and when they reached approximately 1.5 cm. in diameter, a circumscribed ulcer appeared at the peak of the papule. The ulcers resisted all previous treatment and a serum-like exudate continued to ooz and form crusts over the craters (fig. 2).

The hound, when not hunting, was kept in the owner's backyard chained to a doghouse. The bedding of the doghouse was straw. The diet consisted of cracklings, cornbread, and meat scraps.

The hound was in good health, hunted well, but had a chronic cough. A radiograph of the chest (fig. 1) and a biopsy of the lesions (fig. 3) were ordered.



Here Is the Diagnosis

(Continued from preceding page)

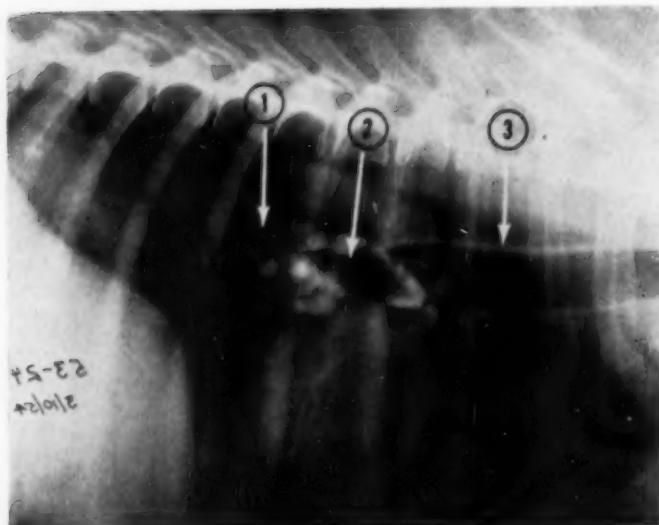


Fig. 4—The radiograph of the thorax shows the mediastinal lymph nodes to be large and dense enough to show a distinct shadow. The lung fields are clear [trachea 1, lymph nodes 2, lung 3].

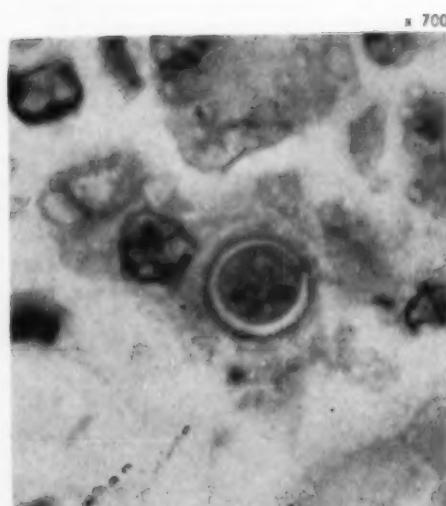


Fig. 5—Blastomyces found in the skin lesion.

Microscopic sections of the skin lesions yielded many organisms of blastomycosis. When the public health aspect of this case was explained, euthanasia was accepted.

At necropsy, the lesions of the thorax were found to be limited to the mediastinal lymph nodes. This is a little unusual for blastomycosis because the lungs are usually diffusely affected. The diagnosis was blastomycosis.

This case was submitted by Drs. Ralph E. Witter, Alfred G. Schiller, C. C. Morrill, and D. D. Maksic of the School of Veterinary Medicine, University of Illinois, Champaign.

Our readers are invited to submit case histories, radiographs, and diagnoses of interesting cases which are suitable for publication.

Nitrate Poisoning in Cattle Due to Ingestion of Variegated Thistle, *Silybum Marianum*

JOHN W. KENDRICK, D.V.M., M.S.; JOHN TUCKER, Ph.D.;
S. ANDERSON PEOPLES, M.D.

Davis, California

VARIEGATED THISTLE (*Silybum Marianum*), commonly called milk thistle or bull thistle, is widely distributed in California. In some areas, it is used in the mature stage as a winter feed. However, until the outbreak described in this paper occurred, it had not been incriminated in the United States as a poisonous plant.

The variegated thistle is a herbaceous annual or biennial, 2 to 6 ft. in height, depending on moisture and fertility of the soil, and has an erect stem usually branched in the upper part. The large lower leaves are 12 to 24 in. long and half as wide, usually deeply lobed, with spiny margins. The upper leaf surface is mottled with a network of conspicuous white blotches. The single flower head that terminates each branch is purple, about 2 in. in diameter, and is armed with numerous stout spines (fig. 1).

Poisoning of livestock by ingestion of plants that accumulate significant amounts of nitrate has been reported on several occasions.¹⁻³ Oat hay and pigweed (*Amaranthus retroflexus*) are among those mentioned. Sugar beets sprayed with 2,4-D developed concentrations equivalent to 1.8 to 8.77 per cent potassium nitrate (KNO₃).⁴ A concentration of 1.5 per cent is considered the toxic level.¹ A recent survey in Queensland revealed that 55 species of flowering plants, out of a total of 589 tested, contained significant amounts of nitrate.⁵ In a six-year period, 210 sheep and cattle and several horses in New South Wales died after eating variegated thistle.⁶

THE OUTBREAK

We were called on May 18, 1953, to a ranch in the vicinity of Davis to investigate the death of several yearling Shorthorn heifers. On arrival, 7 animals were found dead, 2 severely ill, and 51 apparently unaffected. The sick animals were down and both were exhibiting the following signs: cyanotic mucous membranes; pulse about 150; respiration accelerated and labored; able to rise but weak and staggering; diarrhea; and their urine was colorless and was

voided frequently. One animal urinated small amounts four to five times in the fifteen minutes it was on its feet. A drawn sample of blood was a chocolate brown. The



From Robbins, Beliae, Ball, "Weeds of California"
Fig. 1—Variegated thistle, *Silybum Marianum*.

provisional diagnosis was nitrate poisoning. These 2 animals died within one-half hour.

The remaining animals were moved to a corral about 500 yards from the pasture. Although apparently healthy, some had a diarrhea and as they were driven to the corral they dribbled small amounts of clear watery urine. However, they did not stagger nor show any indication of tiring from the drive. A few animals were examined; their membranes were normal and the pulse rate and temperatures were slightly elevated. All were maintained on hay for two days and then moved to a new pasture; no further deaths occurred.

Two animals were examined postmortem. One that was dead on arrival had pale bluish mucous membranes, chocolate brown blood, moderate inflammation of the mucosa

From the School of Veterinary Medicine (Kendrick and Peoples) and the Department of Botany (Tucker), University of California, Davis.

of the abomasum, bloody fluid in the pericardial cavity, and a few petechiae on the epicardium. Another, which died while the clinician was present, showed a mild inflammation of the abomasum, fluid in the pericardial cavity, and chocolate-colored blood.

TABLE I—Results of Analysis of Thistle Leaves and Stems for Nitrate

| Samples | Per cent of nitrate | |
|---------|---------------------|--------|
| | Stems | Leaves |
| 1 | 0.53 | 3.03 |
| 2 | 2.61 | 10.3 |
| 3 | 0.12 | 0.53 |
| 4 | trace | trace |
| 5 | trace | trace |
| 6 | trace | trace |
| 7 | trace | trace |
| 8 | 0.009 | trace |
| 9 | trace | trace |
| 10 | trace | trace |

*Nitrate analyses by Mr. Joseph E. Ruckman, Agronomy Division, University of California, Davis.

The animals involved in this outbreak had been pastured for several months on 120 acres of foxtail grass, "ripgut" grass, and milk thistle. The thistles in this pasture seemed stunted and were not over 3 ft. high. There was no evidence that any of these thistles had been eaten. The day before deaths occurred, a gate had been opened into an adjacent pasture with an area of about 1 acre where this milk thistle grew luxuriantly to a height of 6 ft. or more, the only vegetation in this area.

In the morning, when the animals were found dead, the leaves had been eaten from the thistles over an area of about half an acre. Seven of the 9 animals lost were found within 50 yards of the thistle area and the other 2 were about 100 yards away. The rumen content of the 2 animals that were autopsied contained large amounts of thistle. Although many of the healthy animals were in the vicinity, none were eating thistle.

Blood, ingesta, plants from which the animals had eaten, and salt from a nearby trough were collected for laboratory examination. Methemoglobin* was found in the blood sample by a qualitative test.

A quantitative test for nitrate ion gave the following results: plants, 0.13 per cent; abomasum contents, 0.09 per cent; rumen contents, 0.08 per cent; salt, 0.045 per cent.

On May 24, as a second sample, 10 intact plants were collected from around the periphery of the eaten-over area, the stems

being cut 6 in. or less from the ground. They were selected from the taller, more luxuriant clumps. In each case, the leaves were removed and analyzed for nitrate separately from the stems. The results are shown in table 1.

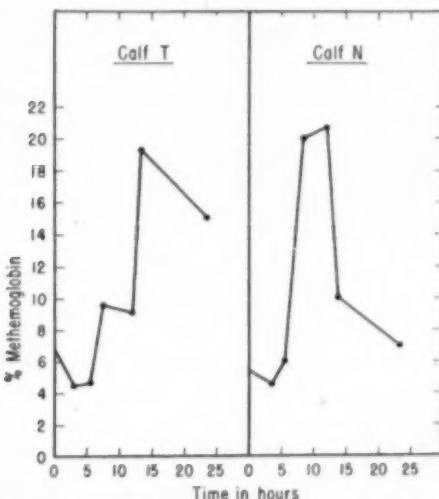
The diagnosis, nitrate poisoning due to ingestion of the milk thistle, was made since it was the only new feed available to the heifers, they had consumed large quantities of it, the deaths occurred soon after, and the immediate cause was methemoglobinemia. That nitrate was found in the ingesta only in very low concentration can be explained by the mechanism of nitrate poisoning in which the nitrate is changed in the stomach to nitrite and this in turn is absorbed to convert hemoglobin to methemoglobin. The remains of plants which had been partially eaten contained very low concentrations of nitrate. However, Gilbert *et al.*³ stressed the extremely variable content of nitrate from plant to plant at a single location due to variations in shading, availability of soil nitrogen, and flush of growth. Table 1 confirms this variability. Apparently, the plants in the original sample had, by chance, been of low content. Confirmation of our diagnosis was also sought in a feeding experiment.

FEEDING TRIAL

Materials and Methods.—Two trials were conducted, the first on May 28, the second on June 11, 1953. In each experiment, approximately 30 tall plants with large succulent leaves were harvested from the same area as the samples reported in table 1 and were stored in the barn overnight before being fed.

Trial 1.—Two Holstein-Friesian calves, each weighing approximately 200 lb., were labeled T and N, and placed in a box stall, with all food except water withheld for twelve hours. At 9:00 a.m., 10 of the suspected plants were placed in the stall with the calves. At 12:30, when all the leaves were eaten, 10 more plants were offered. At 4:30 p.m., when most of the leaves again had been eaten, symptoms of poisoning appeared in calf N. It was tied away from the feed and treated with 20 cc. of 4 per cent methylene blue. At 6:00 p.m., symptoms appeared in calf T, so the remaining thistles were removed and hay was offered, both calves eating it greedily. Blood samples had been taken periodically for examination for methemoglobin (graph 1) and the pulse and other signs recorded. It was not deemed necessary to kill the animals to arrive at a positive diagnosis, so the feeding was stopped as soon as the pulse increased and the blood turned brown. Both calves made uneventful recoveries.

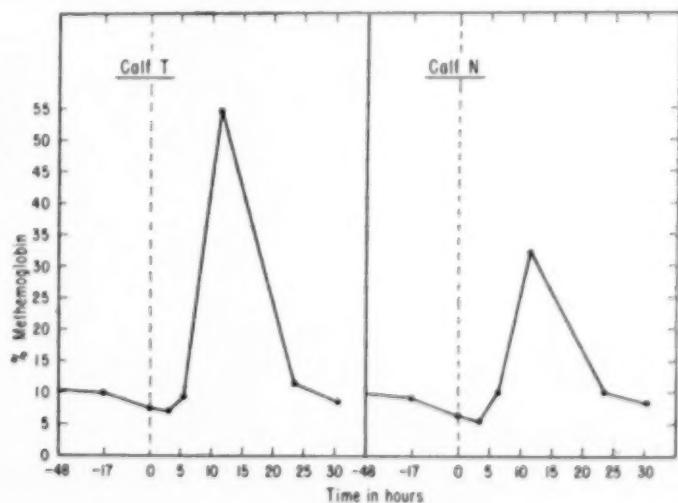
*Methemoglobin determinations by Mr. Crawford Brown, School of Veterinary Medicine, University of California.



Graph 1—Results of the analysis for methemoglobin in calves fed thistles in trial 1.

Trial 2.—Two weeks later, the experiment was repeated. The same 2 calves were confined to a box stall and were fed mixed hay and ground barley for eighty-four hours or until twelve hours prior to the experimental feeding, when all feed was removed and sawdust was substituted for the straw litter. Nine of the suspected plants were fed at 8:30 a.m.; 5 at noon; and 5 at 3:00 p.m. Little of the feed was consumed until afternoon and only about two-thirds of the leaves were eaten by 8:00 p.m. when they were removed and hay was offered and greedily consumed. No treatment was given.

Graph 2—Results of the analysis for methemoglobin in calves fed thistles in trial 2.



RESULTS

The results of the analysis for methemoglobin determination, by the method of Evelyn and Malloy,⁷ are shown in graphs 1 and 2.

In trial 1, calf T reached a peak methemoglobin concentration of 19.3 per cent and a pulse rate of 124 per minute in 13.75 hours. Depression, frequent urination, and beginning diarrhea were also noticed at this time, but no appreciable change in the mucous membranes. Calf N, at twelve hours, had a peak methemoglobin of 20.7 per cent, a pulse of 108, with frequent urination and depression. At 23.5 hours, both calves had a pulse of 100, diarrhea, and polyuria, but a good appetite and attitude. Also calf N, which had received the methylene blue, had 7.0 per cent methemoglobin while calf T had 15.1 per cent methemoglobin. At 71.5 hours, the methemoglobin had fallen to zero (graph 1).

Trial 2 was similarly conducted except that the calves were put in a stall four days prior to feeding and two methemoglobin determinations were made during this time. Both calves reached the peak concentration of methemoglobin at 11.5 hours, when calf T showed 54.6 per cent and calf N showed 32.5 per cent, with their pulses being 146 and 108, respectively. Frequent urination and a depressed attitude were evident. Neither calf was treated and the methemoglobin at 23.5 hours was 11.3 per cent for calf T and 10 per cent for calf N (graph 2).

DISCUSSION

Many things which may cause a methemoglobinemia were not unequivocally eliminated so positive proof of nitrate poisoning was not established. However, the disease, as observed in the field, was reproduced in detail with the plants which apparently caused the outbreak. Nitrate poisoning has been definitely attributed to plant sources by Bradley, *et al.*¹ He made a water extract of oat hay containing high quantities of nitrate, which was divided in two parts and all nitrates were removed from one portion. When calves were drenched with these solutions, the 1 that received the untreated extract developed methemoglobinemia while the 1 that received the nitrate-free extract remained healthy. In our experiments, the diagnosis of nitrate poisoning was based on the uniform appearance of a methemoglobinemia after feeding plants known to have a high nitrate content, frequent urination, and increased pulse rate, all of which conform to the accepted symptomatology.

In both trials, there was a relatively high pretreatment level of methemoglobin. In the first trial, the calves had been on pasture until the experiment began but in the second trial they were on mixed hay for four days. For the purpose of comparison, 20 cows in an unrelated, normal herd were tested for methemoglobinuria. The average was 12.4 per cent \pm 1.84 per cent so it was concluded that cattle may normally have a mild methemoglobinemia.

SUMMARY

Nitrate poisoning of 9 of 60 heifers due to the ingestion of *Silybum marianum* (milk thistle, bull thistle, or variegated thistle) on May 16, 1953, is reported. The primary postmortem finding was the chocolate-colored blood typical of methemoglobinemia. Thistles collected from the area contained high levels of nitrate. Symptoms of the disease were reproduced experimentally by feeding thistles harvested from the area on May 28, 1953, and June 11, 1953.

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A Test for Avian Lymphomatosis

An enzyme activity test of the blood plasma of chickens, which was correctly positive in 40 of 42 cases of visceral lymphomatosis, while being negative in 300 healthy chickens, has been developed at the Regional Poultry Disease Laboratory at East Lansing, Mich. It will enhance research by identifying the disease in birds used for transmission or immunity studies. It might be used to indicate early development of the disease in market flocks. The visceral form of lymphomatosis is the most lethal, followed by the neural and ocular forms.—*J. Agric. Res.*, Nov., 1954.

Streptococcic Arthritis in Pigs

When 2 of a litter of 12 pigs 10 weeks old were found showing symptoms of arthritis and meningitis, with a dazed appearance and temperatures of 105 F., both were able to stand and had normal temperatures in twenty-four hours after receiving crystalline penicillin intramuscularly. Each was then given 4 cc. of duracillin and the next day were indistinguishable from the others. During the season, 90 per cent of the pigs in 19 litters were thus affected. When treated with 2 cc. of duracillin, repeated in twenty-four hours, all recovered. While a single treatment with the latter brought apparent recovery, relapses were frequent.—*Vet. Rec.*, Oct. 9, 1954.

Psittacosis Control.—Psittacosis has been eliminated from parakeet aviaries by injecting all the birds twice a day for fourteen days with aureomycin® or achromycin.—*Sci. News Letter*, Nov. 6, 1954.

Salmonella Isolations from Dehydrated Dog Meals

MILDRED M. GALTON, Sc.M.; MYRA HARLESS; A. V. HARDY, M.D.

Jacksonville, Florida

IN RECENT YEARS, evidence has accumulated on the prevalence of *Salmonella* infections in dogs. Of 1,626 normal dogs examined in Florida, 244 (15%) were positive.¹ Following the isolation of *Salmonella* from 70 per cent of 40 dogs in one veterinary hospital, the source of infection was sought by bacteriological surveys of the environment and foods. *Salmonella* were isolated from beef livers which served as the basic food in this hospital. These livers were obtained locally and included those rejected for human consumption. Brown² reports that edible viscera rejected for human use in poultry-processing plants in California are commonly sold for use in commercial dog foods. Subsequent studies^{3,4} have revealed a high prevalence of *Salmonella* in the environment of abattoirs and in pork sausage. These findings have led to an investigation of the possible occurrence of these organisms in dehydrated commercial dog food.

Samples of 19 brands of dog food were purchased on the retail market in sealed packages of 1- to 5-lb. each. Three additional brands were available only in 100-lb. sacks and samples of these were transferred to new paper bags from recently opened sacks. Information obtained from nine manufacturers indicated that meats for dog foods were obtained primarily from nationally known packing houses and rendering plants. The samples for examination were obtained over a twelve-month period from different retail stores throughout the city, thus assuring a representative sampling of the products. The "tergitol technique" devised for the examination of meat products⁴ was used for this study. Exacting precautions were followed to prevent possible extraneous contamination.

A total of 159 samples of dehydrated dog foods have been tested. *Salmonella* were isolated from 26 (26.5%) of 98 samples of dog meal, but none were found in 54 samples of pressed foods (dog "bones," biscuit, flakes, kibbled products) or seven samples of dog "candy," as shown in table 1. Those products containing the largest known amounts of meat meal (12.5% to 25.0%) commonly yielded *Salmonella*. The two brands of dog meal which failed to yield *Salmonella* are sterilized at sufficient temperature and time to kill these organisms.

As with the sausage samples, cultures were examined in duplicate in the tetrathionate-tergitol enrichment. Of the first 11 positive samples, nine yielded *Salmonella* from one enrichment broth only. To determine whether added inoculums from a sample would yield added positive reactions, 30-Gm. portions from each of 52 packages were inoculated into each of 15 bottles containing 100 ml. of enrichment, with tergitol added to the "sudsing point."

TABLE 1—*Salmonella* in Dehydrated Dog Foods

| Source | No. examined | Positive for <i>Salmonella</i> | |
|----------------------|--------------|--------------------------------|-------|
| | | (No.) | (%) |
| DOG MEAL | | | |
| 1 | 13 | 9 | 69.2 |
| 2 | 16 | 5 | 31.3 |
| 3 | 14 | 5 | 21.4 |
| 4 | 15 | 2 | 13.3 |
| 5 | 8 | 1 | 12.5 |
| 6 | 12 | 3 | 25.0 |
| 7 | 1 | 1 | 100.0 |
| 8 | 2 | 1 | 50.0 |
| 9 | 4 | 1 | 25.0 |
| 10 | 12 | 0 | — |
| 11 | 2 | 0 | — |
| Total | 98 | 26 | 26.5 |
| PRESSED FOODS | | | |
| 12 | 5 | 0 | — |
| 13 | 10 | 0 | — |
| 14 | 11 | 0 | — |
| 15 | 9 | 0 | — |
| 16 | 6 | 0 | — |
| 17 | 6 | 0 | — |
| 18 | 6 | 0 | — |
| 19 | 3 | 0 | — |
| Total | 54 | 0 | — |
| CANDY | | | |
| 20 | 3 | 0 | — |
| 21 | 2 | 0 | — |
| 22 | 2 | 0 | — |
| Total | 7 | 0 | — |
| Grand total | 159 | 26 | — |

From the Bureau of Laboratories, Florida State Board of Health, Jacksonville; bacteriologist (Galton); junior assistant (Harless), and director (Hardy). Miss Galton is now at the Communicable Disease Center, P. O. Box 185, Chamblee, Ga.

This work was done under the sponsorship of the Commission on Enteric Infections, Armed Forces Epidemiological Board, and was supported in part by the Office of the Surgeon General, Department of the Army, and the Communicable Disease Center, Public Health Service, Department of Health, Education and Welfare, Atlanta, Ga.

Oft these samples examined by multiple inoculums, 15 (28.8%) were positive. *Salmonella* organisms were isolated from only one of the 15 bottles in nine of the 15 positive samples. Since this multiple sampling

TABLE 2—Distribution of *Salmonella* Types in Dehydrated Dog Foods

| Type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Total |
|-----------------------|----|----|----|----|---|----|---|---|---|-------|
| <i>S. anatum</i> | 2 | — | 2 | — | 1 | — | — | — | — | 5 |
| <i>S. derby</i> | 1 | — | — | 1 | — | — | 1 | 1 | 4 | |
| <i>S. typhimurium</i> | — | 2 | — | — | 1 | 1 | — | — | — | 4 |
| <i>S. oranienburg</i> | 1 | 2 | — | — | 1 | — | — | — | — | 4 |
| <i>S. senftenberg</i> | 1 | — | — | — | 1 | 1 | 1 | — | — | 4 |
| <i>S. montevideo</i> | 2 | — | — | — | — | — | — | — | — | 2 |
| <i>S. bareilly</i> | 1 | — | — | — | — | — | 1 | — | — | 2 |
| <i>S. cubana</i> | 2 | — | — | — | — | — | — | — | — | 2 |
| <i>S. minnesota</i> | 1 | — | 1 | — | — | — | — | — | — | 2 |
| <i>S. bredeney</i> | 1 | — | — | — | — | — | — | — | — | 1 |
| <i>S. thompson</i> | 1 | — | — | — | — | — | — | — | — | 1 |
| <i>S. tennessee</i> | — | — | — | — | — | — | 1 | — | — | 1 |
| <i>S. kentucky</i> | 1 | — | — | — | — | — | — | — | — | 1 |
| <i>S. panama</i> | — | — | — | 1 | — | — | — | — | — | 1 |
| <i>S. lexington</i> | 1 | — | — | — | — | — | — | — | — | 1 |
| <i>S. newington</i> | 1 | — | — | — | — | — | — | — | — | 1 |
| <i>S. illinois</i> | — | 1 | — | — | — | — | — | — | — | 1 |
| Total isolations | 16 | 5 | 3 | 2 | 1 | 4 | 3 | 2 | 1 | 37 |
| Total pos. specimens | 9 | 5 | 3 | 2 | 1 | 3 | 1 | 1 | 1 | 26 |
| Total specimens | 13 | 16 | 14 | 15 | 8 | 12 | 1 | 2 | 3 | 84 |

is not practical for volume work, larger inoculums in proportionately large volumes of enrichment were tried. For this, 300 Gm. of the sample were placed into 1,500 ml. of enrichment in a 3-liter flask. After overnight incubation, the mixture was streaked on ten brilliant green agar plates. Of 20 packages of dehydrated dog meals examined by this method, three were positive; whereas, when multiple smaller inoculums were used, eight were positive.

During this study, 17 *Salmonella* serotypes were isolated from commercial dog meal samples. All of these types, with the exception of *Salmonella lexington*, were obtained from dogs in Florida, and 15 of these were isolated from human beings. In an earlier study, *S. lexington* was found in swine. The distribution of *Salmonella* types is shown in table 2.

The transmission of *Salmonella* organisms directly from animals and through food products to man is an important public health problem. The evidence presented suggests that commercially prepared animal foods may be an important source of infection. It is reasonable to hope that techniques in processing may be modified to eliminate these viable pathogens in the final product.

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Outbreak of *Pasteurella Mastitis*

In a herd of 20 low-producing cows in an unsanitary environment, 14 developed mastitis in 30 quarters. The first sign, milk that filtered slowly, was followed in twenty-four hours by a slight swelling of the quarter, a drop in production, and yellowish viscid clots in the foremilk. In a few days, all the milk from the quarter was thick, viscid, and yellowish clots settled, leaving a watery supernatant fluid. Later, milk ceased in all quarters while atrophy and fibrosis developed in the infected quarters. No general symptoms were observed. All treatment was disappointing but streptomycin seemed the most effective of the antibiotics. The addition of hyaluronidase, streptokinase or streptodornase seemed of no value. An autogenous bacterin of *Pasteurella multocida* was used but its value could not be assessed.

Methionine for Ketosis in Ewes.—In France, 2 ewes in late pregnancy affected with ketosis were given daily intravenous injections of 0.15 to 0.225 gr. of methionine. The nervous symptoms disappeared completely in 1 animal and the other was greatly improved.—*Vet. Bull.*, Sept., 1954.

Calf Cud Inoculation Ineffective.—At Cornell University, one half of 48 calves, isolated at 3 days of age, were given fresh cud from normal cows at 10, 15, and 20 days of age. It had little or no influence on their growth, scouring, rumen flora, or food preferences.—*Farm Res.*, 20, April, 1954.

The top Hereford bull at a Romeo, Mich., sale brought \$85,500; 43 bulls averaged \$3,349.—*Breeders' Stockman*, Nov., 1954.

Brucellosis and Leptospirosis Serological Test Results on Serums of Wisconsin Veterinarians

E. V. MORSE, D.V.M., Ph.D.; VIRGINIA ALLEN, M.S.;
G. WORLEY, Jr., M.D., Ph.D.

Madison, Wisconsin

Blood serum samples of 104 veterinarians were collected at the January, 1954, meeting of the Wisconsin Veterinary Medical Association at Milwaukee.

For brucellosis, the plate- or rapid-agglutination test, employing 1:40, 1:80, etc., serum dilutions, was used. Duplicate tests were conducted, using the standard BAI plate antigen of *Brucella* and an antigen prepared by the State Laboratory of Hygiene, which is routinely used for the diagnosis of human brucellosis in this state.

For leptospirosis, the tube, microscopic, agglutination-lysis test, using living antigens was employed with 1:10, 1:100, and 1:10,000 serum dilutions. The serums were tested against the following leptospiral serotypes: *Leptospira canicola*, *Leptospira icterohemorrhagiae*, *Leptospira pomona*, *Leptospira hebdomadis*, *Leptospira australis A*, *Leptospira australis B*, *Leptospira okinawa*, *Leptospira bataviae*, *Leptospira grippotyphosa*, *Leptospira ballum* and *Leptospira autumnalis AB*.

The results of the serological tests are shown in table 1.

Approximately 38 per cent of the serums had *Brucella* agglutinins. However, only one serum (1:160) gave a titer considered of diagnostic significance. A number of the veterinarians gave histories indicating "accidents" which occurred while vaccinating calves with *Brucella abortus*, strain 19. This factor, as well as contact with infectious materials from cattle offers an explanation for the titers.

Bovine and porcine *L. pomona* infections are prevalent in Wisconsin. Several of the veterinarians were known to have had contact with infected cattle. Positive reactions were observed with 11 serums. Six reacted with one leptospiral antigen; three with two antigens, and two of the serums gave positive reactions with three antigens. The

TABLE I—The Results of the Serological Tests on Wisconsin Veterinarians

| Antigen | Titer | No. of Serums |
|------------------------------|----------|---------------|
| <i>Brucella</i> | Negative | 65 |
| | P* 1:40 | 26 |
| | 1:40 | 8 |
| | 1:80 | 4 |
| | 1:160 | 1 |
| <i>L. canicola</i> | P** 1:10 | 1 |
| | 1:10 | 1 |
| | 1:100 | 1 |
| <i>L. pomona</i> | P 1:10 | 3 |
| | 1:10 | 1 |
| | 1:100 | 1 |
| <i>L. icterohemorrhagiae</i> | P 1:10 | 1 |
| <i>L. okinawa</i> | P 1:10 | 1 |
| <i>L. australis A</i> | P 1:10 | 1 |
| <i>L. hebdomadis</i> | P 1:10 | 4 |
| <i>L. ballum</i> | 1:10 | 1 |
| <i>L. autumnalis AB</i> | P 1:10 | 1 |
| | 1:10 | 1 |

*P = incomplete or partial agglutination of *Brucella* antigen; **P = 50 per cent agglutination or lysis of leptospiral antigen. All other titers read as complete (100%) agglutination or lysis.

results indicate that these individuals had contact with one or more species of *Leptospira*. The most significant titers (1:100) were one each with *L. canicola* and *L. pomona*; however, none of the veterinarians gave histories indicating leptospirosis.

Results of a recent leptospiral serological survey on samples from 148 Iowa veterinarians indicated "past experience" on the part of 34 individuals with *L. canicola* and two persons with *L. pomona*.¹

Infections of human beings with *L. pomona* contracted from cattle or swine continue to remain a rarity in the United States.^{1,2} This situation may be due, in part at least, to failure of its recognition. The disease produced by this serotype certainly represents a potential human health hazard but so far clinical evidence with laboratory confirmation has not been found in this state.

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The sea otter eats about one third of its own weight every day.—Sci. News Letter, July 17, 1954.

From the Department of Veterinary Science (Morse) and the State Laboratory of Hygiene, Medical School (Allen and Worley), University of Wisconsin, Madison.

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A Case of Canine Tetanus

W. E. BLAKE, D.V.M.

Tampa, Florida

This is a report of a case of tetanus in an 11-month-old mixed breed bitch. When she was brought to us for an ovariohysterectomy two weeks after having weaned a litter of puppies, no wounds were noticed nor was there a history of any. The surgery was performed, the incision healed by first intention, and the patient was discharged, apparently in good health, five days after the operation.



Fig. 1—Eleven-month-old mixed breed bitch with tetanus.

Two days after discharge, she was returned for examination because of frequent vomiting. She had a normal temperature and no sign of stiffness at that time. Thinking that it was just a simple digestive upset, due to the change from hospital to home food, a preparation was dispensed for treatment at home.

Three days later, she was returned with a history of continued vomiting and "now has something wrong with her eyes." Her temperature was still normal but examination revealed an abnormally prominent membrana nictitans and a startling gross change in facial expression. The ears, which normally drooped were now standing upright and were rigid. The skin between the ears lay in folds and the bases of the ears were pulled medially. The tension in

the skin of the head pulled the eyelids until the openings were mere slits. This produced a foxlike expression which, on first observation, suggested rabies. The neck muscles were somewhat stiffened but otherwise mobility was not impaired. Complete trismus did not occur in this animal, although there was some slight difficulty in eating.

Therapy consisted of tetanus antitoxin (10,000 units) intramuscularly and barbiturates sufficient to relieve the muscle contractions. However, the stiffness extended posteriorly, eventually producing the typical sawhorse attitude, even when she was lying down, which progressed until walking was impossible.

Death occurred on the fifth day after definite tetanic symptoms were recognized (postoperative day 15). Panting and other signs of respiratory distress were prominent during the twenty-four hours preceding death. It is not known whether the infection entered through the surgical incision or through some puncture wound that was not located.

Oral Vaccination for Newcastle Disease

An attenuated Newcastle disease vaccine was given in the feed to 16 fowl 3 to 6 months old; in the drinking water to 61, 10 days to 2 months old; and a similar number of each age group were vaccinated intradermally. The protection afforded by the food method twelve days after vaccination, as judged by the presence of titers in the serum, was slight whereas those vaccinated with drinking water were comparable to those intradermally inoculated.—*Vet. Bull., Oct., 1954.*

Cortisone, a Triple-Edged Sword

Therapeutic agents are often thought of as double-edge swords, having good as well as bad effects. However, it is necessary to think of cortisone, and probably ACTH, as a triple-edged sword with the third edge being a series of delayed bad effects which may result in death months or even years after the drug is taken. This should not discourage the use of the drug when it is indicated but the dose should be minimal and discontinued as soon as possible.—*Ann. Allergy, Sept., 1954.*

Succinylcholine in Tetanus in Man

Since the muscular hypertonia of tetanus varies frequently and unpredictably, the dose of a muscle relaxant effective at times of convulsions may be sufficient to cause respiratory paralysis, necessitating artificial respiration. Only a short-acting relaxant such as succinylcholine can meet this extreme demand without the hazards of overdosage.—*Brit. M. J., Sept. 18, 1954.*

Tetanus Immunity Oddities

Tetanus is not an immunizing disease, one person having recovered from three attacks, and repeated accidental exposure does not confer active immunity. If given simultaneously, the antitoxin will interfere with the antigenic activity of the toxoid. An injection of 1,500 units of antitoxin gives a person a titratable immunity for two to three weeks, 10,000 units for six to ten weeks, and 100,000 units for eight to eleven weeks or more; therefore, toxoid should be delayed for such periods. Following one injection of toxoid, the second injection will complete the immunizing even if given several years later.—*J.Am.M.A., Oct. 2, 1954.*

Pitch Poisoning in Pigs

Two weeks after a group of 12- to 14-week-old pigs had been housed in a new building, progressive unthriftiness developed. A month later 4 had died; many had poor appetites, were emaciated, pot-bellied, and coughing but they had no diarrhea. Necropsy of 4 of the badly affected pigs revealed an enlarged, extremely friable liver with fibrinous strand on the surface, prominent lobules, and a mottled, mosaic pattern on the cut surface. A blood-stained fluid was found in the abdominal cavity and a straw-colored fluid in the pleural cavity. Similar pigs in other houses were normal.

The floor of the new building was made of old railway ties leveled off with pitch, with evidence that the pigs had been eating the pitch. When this pitch was fed experimentally to 5 other pigs, all developed similar lesions but 3, 60-lb. pigs each ate 0.38 oz. per day for twenty-eight days without definite signs of poisoning while 2, weighing 40 lb., were given 0.33 oz. per day for twelve days and developed mild symptoms.—*Vet. Rec., Oct. 23, 1954.*

Heredity and Swine Erysipelas

Fortner (Germany) showed that different families of swine, when exposed to erysipelas under identical conditions, reacted quite differently, some developing a mild form of the disease, others a fatal form. Subsequent generations reacted identically, indicating that resistance was inherited.—*Vet. Bull., Sept., 1954.*

Psittacosis Control by Antibiotics

Psittacosis, or ornithosis, is now so widespread in such a variety of birds that there is little hope for its eradication. In order to eliminate infection and establish disease-free flocks, an expensive, tedious experiment was undertaken in California under the supervision of Dr. Karl F. Meyer. Several flocks of parakeets and one of pigeons were injected twice daily (the pigeons three times daily) for fourteen to twenty-five days with one of the tetracycline group of antibiotics. Three to six weeks later, when some of the treated birds were killed and found to be negative for virus, they were moved to clean quarters to be used as breeders. The treatment cost about 20 cents per bird but the testing was much more costly. The infection-free offspring are especially susceptible, so rigid precautions are necessary to prevent reinfection. Such a method might be used on birds before they are imported into the United States.—*All Pets Magazine., Nov., 1954.*

Amebic Infections in Dogs.—From 143 fecal specimens taken directly from the rectums of apparently healthy dogs in Tennessee, *Entameba histolytica* was cultured from 12, *Escherichia coli* from two, and *Endolimax nana* from one specimen. Cysts of ameba are seldom passed in the feces of dogs and trophozoite forms are passed only in small numbers.—*Vet. Bull., Oct., 1954.*

New Synthetic Hormones for Arthritis.—Two partially synthetic drugs, metacortandralone and metacortandrosin, appear to be three to four times more potent than cortisone, without increased side effects. Neither steroid is heralded as a cure for arthritis but they appear to be better than those now available.—*Sci. News Letter, Nov. 13, 1954.*

NUTRITION

Trace Minerals in Cattle Rations

A question often asked by cattlemen is, "Should trace minerals be added to cattle rations?" Research conducted at the Ohio and Kansas agricultural experiment stations indicates that the answer depends on the quality of the roughage fed and also the soil on which the roughage is grown. In research at Ohio^{1,2} a larger number of animals were used in the investigation, whereas at Kansas³⁻⁵ fewer animals were used but a detailed study of the blood and tissues was made.

The Ohio workers found that a trace mineral supplement increased the weight gains of steers fed a poor quality of hay (late-cut timothy hay exposed to the weather). The Kansas workers found that exposing prairie hay to abundant rainfall, after cutting, lowered the quality so that trace mineral supplementation improved the general appearance and hair of cattle and also increased the size of their erythrocytes (the mean corpuscular volume). The latter is obtained by dividing the volume of packed erythrocytes (ml.) in 1,000 ml. of blood by the total number of erythrocytes/cu. mm. of blood expressed in millions. This change was produced primarily by an increase in the volume of packed erythrocytes. When 2 lb. of alfalfa hay per head were fed daily, no significant change in the blood picture was obtained by feeding the trace minerals. In another experiment,⁵ Kansas workers found no improvement in growth or in the blood picture after feeding trace minerals to cattle that had been fed well-cured wheat straw for six months as the only roughage. This investigation is being continued for another six months.

On the basis of these investigations, one should recommend the addition of trace minerals to cattle rations when roughages lowered in quality by weather conditions are fed. A universal mineral mixture that can be fed free-choice consists of 32 per cent steamed bone meal, 32 per cent ground limestone, 32 per cent iodized salt, and 4 per cent trace mineral mixture containing

iron, copper, cobalt, zinc, and manganese. The iodized salt and the trace mineral mixture may be replaced with a comparable quantity of trace mineralized salt. In the event a well-cured legume hay is being fed, the trace minerals and ground limestone can be eliminated from the mineral supplement. It is important to feed the supplement free-choice and in "loose" form protected from rain. The feeding of minerals in block form should be discouraged since the animals spend too much time licking salt and usually do not get enough to supply their needs.—*Melvin J. Swenson, D.V.M., Dennis D. Goetsch, D.V.M., G. K. L. Underbjerg, D.V.M., Department of Physiology, School of Veterinary Medicine, Kansas State College, Manhattan.*

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Animal Fats in Feeds Increasing

In two years, the rate of use of animal fats by the feed industry has increased from an annual rate of 10,000 lb. to 250 million lb. The industry now takes about 25 per cent of the animal fat surplus which was created largely by the use of synthetic detergents in the soap industry.

The feed industry has had to learn how to handle fats in feed processing; the increased use may continue as long as the cost is less than approximately three times that of corn. It is used chiefly in poultry feeds. Since animals generally regulate their

This article, one of several requested by the JOURNAL, was provided by the AVMA Committee on Nutrition.

eating by its caloric contents, fats must be limited or they will get the necessary calories while eating an insufficient amount of vitamins, proteins, and other components.—*J. Agric. and Food Chem.*, Nov. 10, 1954.

Opinions on Dairy Calf Feeding

Ten dairymen from seven widely scattered states answered questions on feeding dairy calves in *Hoard's Dairymen* (Oct. 10, 1954) as follows:

- Q.—How long are calves fed whole milk?
A.—Ten to ninety days, average five weeks.
- Q.—When do calves start eating grain?
A.—One week [3 started them earlier by placing grain in the calves' mouths after each feeding].
- Q.—Do you favor the feeding of antibiotics?
A.—Never used (5); no benefit (1); controls scours (3).
- Q.—What vitamins are fed?
A.—None (8); A, plus yeast (1); A plus D (1).
- Q.—What minerals are fed?
A.—None (2); bonemeal (2); trace minerals (3); commercial mixtures (4).
- Q.—What is done with the extra colostrum?
A.—Not used (4); fed to older calves (4); stored (2).
- Q.—How is scours controlled?
A.—Portable pens moved weekly (1); sanitation and clean bedding (3); air conditioning (1); limiting the feeding (5); feeding antibiotics (2); giving sulfonamides (2); injecting penicillin (1); using bacterin (1).

Pseudovitamin B₁₂.—Microbiologically active compounds known as pseudovitamin B₁₂, can not be differentiated from vitamin B₁₂ by microbial assay or by spectrophotometric assay, but they have no effect upon animal growth. One commercial APF product was found to contain only the pseudovitamin B₁₂.—*J. Agric. and Food Chem.*, July 21, 1954.

Cobalt Deficiency in Ruminants

Cobalt deficiency, investigated in New Hampshire since 1944, was about twice as prevalent in calves and heifers as in milk cows. Sheep and goats were usually more severely affected than cattle. Signs included poor appetite, gnawing wood, constipation, rough coat, scaly skin, loss of hair, unsteady gait, and decreased milk flow. Cobalt sulfate given therapeutically produced a favorable response in 153 of 204 herds treated.

In a controlled experiment, every animal on a low cobalt ration developed deficiency. The cobalt-supplemented animals ate five times more concentrate, six times more hay, and drank twice as much water as the animals on a low cobalt ration but they gained seven times as much and produced about 160 per cent more wool. The deficiency has been eliminated by using 1 lb. of cobalt sulfate in 225 tons of feed.—*Am. Feed Mfg. Nutr. Abstr.*, Nov., 1954.

Vampire Bat Distribution in Mexico

Vampire bats of the genera *Desmodus* and *Diphyella* are reservoirs of paralytic rabies of cattle. *Desmodus* species are present in 17 of Mexico's 31 states while the *Diphyella* species are less widely distributed. In regions where they are common, it is recommended that wire screens be placed on farm buildings and that the places where cattle congregate at night be lighted. The majority of bats on the American continent are harmless and useful.—*Vet. Bull.*, Oct., 1954.

Botulism Outbreak in Mink

In October, 1954, botulism was diagnosed as the cause of death of 4,643 mink in five herds (4 in Wisconsin, 1 in Illinois), apparently due to a common shipment of whale meat which had been imported in a frozen state. In one herd of 4,000 mink, 3,350 died. Dr. G. R. Hartsough, director of Great Lakes Ranch Service, supervised the treatment of that herd. In two herds, many deaths occurred within twenty-four hours of the first feeding of this whale meat. In others, it was as long as seven to fourteen days before death occurred.

In spite of the fact that the feed was immediately and completely removed and that, in several herds all of the animals were immediately given botulinus antitoxin, losses continued for eight days. The antitoxin seemed to have therapeutic value in one herd but none in two herds, even though repeated doses were given. Penicillin given in three herds was of questionable value whereas forced feeding was credited with saving many animals in three of the herds, none in one herd. Kits seemed to be more susceptible than adults.—*Am. Fur Breeder*, Nov., 1954.

EDITORIAL

An Analysis of Veterinary Medical Education as It Applies to the Southern Regional Area

The Southern Regional Education Board in 1952 established a 20-man commission on veterinary education in the south. The interesting and comprehensive report of this commission is contained in an attractive bulletin.*

The preface, written by C. H. Bostian, chancellor, North Carolina State College, Raleigh, points out the value of continued and expanded public relations and public information programs. To illustrate this point, he states: "Despite the growing interest of the public, I believe that the full story of the services which the veterinary profession renders society is not yet generally known;" also "Its greatest usefulness depends on full public understanding of the basic importance of animal health to our economy."

The Board's analysis of the status of veterinary medicine in the 14 states in the Southern Regional Education Compact reveals that there were 3,247 active veterinary personnel in the area in 1954, an increase of about 27 per cent in four years. About 63 per cent were in practice, devoting "about 70 per cent of their practice time with the economically significant animals" and poultry, and 30 per cent to pet animals. Over one half are graduates of the five southern schools,** 66.3 per cent of whom are in practice and 3.3 per cent in teaching or research. Of those from nonregional schools, about 41.2 per cent are practicing and 6.4 per cent teaching or doing research.

Since the average age of the southern area veterinarians is relatively low, about 36 years, the present replacement needs should be about 105 per year. The five schools are graduating about 200 per year. However, measured by the ratio of veterinarians to farm operators, the South would seem to have relatively inadequate veteri-

nary service as compared to other agricultural regions, but on a basis of veterinarians per unit of value of livestock this inadequacy is less evident. Other factors which indicate that the region is not yet saturated with veterinarians are the potential for a greatly increased livestock population and the prevalence of certain animal diseases due to a climate favorable for the latter.

Nevertheless, it is indicated that the "South has reached the point at which it may turn its interest from the establishment of additional schools to the development of graduate education and research in veterinary medicine." At present, the regional schools are relatively unprepared for graduate work so students must go to institutions where problems peculiar to the South may not be appreciated. Whereas in 1954 there were 26 graduate students in the five southern schools, there were 120 in the five other schools with the most graduate students. At present "the total research budget of the five non-southern schools is about the same as the total budget of the southern ones."

Therefore, the Commission recommends:

- 1) That the south increase the cooperative use and development of its five schools of veterinary medicine rather than establish any new school, at least within the next five years.
- 2) The immediate expansion of facilities for training research personnel in the veterinary sciences. In particular, we feel that graduate education in these sciences should be developed at the southern veterinary schools and that adequate fellowships should be provided to attract able students.
- 3) The development of a region-wide program of research in animal health and veterinary diagnostic services by appropriate public and private agencies. The costliness of research, particularly with large animals, implies interstate and regional cooperation; diagnostic services are more appropriately developed by individual states and institutions.
- 4) That the Southern Regional Educational Board, working with this commission, explore the desirability and practicality of a thorough study to determine measures for future needs for veteri-

*"Veterinary Education in the South" obtainable through the Southern Regional Educational Board, 830 W. Peachtree St., N.W., Atlanta, Ga.

**Alabama Polytechnic Institute, University of Georgia, Oklahoma A. & M. College, Texas A. & M. College, Tuskegee Institute.

nary services in order that plans for the development of veterinary education, research, and extension services in the South may be made on the soundest possible basis.

The part of the report which deals specifically with the veterinary profession in the South might well serve as a pattern for other regional groups in appraising the adequacy of veterinary service in their respective regions.

The conclusion of this Commission was that the problems of animal health in the South clearly warrant the investment of large sums of public money in: (1) the training of research scientists in the various aspects of animal health; (2) the training of veterinary practitioners; (3) the training of technicians and instructors necessary to conduct an expanded research and education program; (4) the construction and operation of research facilities; and (5) the expansion of extension education.

These recommendations, while they apply to the southern states, have nationwide application.

A Challenge to the Profession

In times of stress, groups tend to forget their minor differences and to unite to face the issue. Better group cooperation usually results, however, from a sense of responsibility created without stress. The success of the pending nationwide livestock disease eradication program hinges on the leadership and support that only the veterinary profession can provide.

That this country has been made the safest place in the world to raise livestock stems from the long-time realization that the cost of ridding our livestock populations of infectious diseases is far less than the losses that accrue as a result of their presence. Our profession has always been a prime force in developing and continually advancing this philosophy.

However, other economic considerations play an important role in accomplishing this objective. The question, "Who should bear the cost of disease eradication?" has not been completely resolved. Without attempting to debate this point, it is obvious that disease eradication programs do proceed with far greater rapidity when sufficient appropriated funds are available to help defray the losses experienced by livestock owners in such programs.

The action of the Eighty-Third Congress

in allotting \$30 million for brucellosis eradication programs for the next two years removes one of the economic blocks to eradication of this important livestock disease, but the finding of funds is only one phase of the total effort. Marshalling sufficient manpower to conduct a vigorous campaign lies ahead, and it is in this area that the veterinary profession of our country needs to respond.

Neither the federal government nor the states are planning to increase their regular full-time forces for this job, nor should they be encouraged to do so. Steps toward the mobilization into this program of the enormous service capacity of the private practitioner on a basis that it is economically sound for all concerned are in order and should proceed rapidly.

It is as impractical to develop one single plan for practitioner participation as it is to assume that conditions do not vary from one section of the country to another. Therefore, plans must be patterned to fit the local situation.

Now is the time for practicing veterinarians and state and federal officials to sit down and work out mutually acceptable programs which will make it possible for practicing veterinarians to carry out the work which must be done before regulatory officials can certify areas as brucellosis-free.

If "Brucellosis Eradication Is a Challenge to Be Met" (see JOURNAL, June, 1951), it is only a challenge to our abilities to organize our ranks, our capacity to co-operate within our profession and with others, and our willingness to fulfill recognized obligations.

International Sheep Dog Trials

The first International Supreme Championship Sheep Dog Trial held at Olney, Ill., Sept. 16-18, 1954, found 28 dogs from several states and Canada competing. Twelve of these Border Collies survived the preliminary tests of gathering, driving, and penning 3 sheep each. The trials were held for three days, starting shortly after day-break and thousands of people were present each morning to watch these intelligent dogs work. "Rock," owned by Mr. Allen of McLeansboro, Ill., won the championship award.—*Sheep Breeder, Nov., 1954.*

CURRENT LITERATURE

ABSTRACTS

Effect of Age and Pregnancy on Ovine Blood Protein Fractions

Five ewes were bled weekly throughout the entire gestation period and blood serum-albumin, blood serum-globulin, and blood serum-protein levels were determined by a chemical method. Statistical analysis of the results revealed a significant lowering of the serum-globulin which was most apparent during the latter half of gestation. Blood serum and albumin levels dropped during the first half but recovered to original levels by term. Weekly sampling of 6 lambs for ten consecutive weeks revealed a significant rise in blood serum-globulin during this period in 3 of the 6. No change was apparent in blood serum-albumin. Mother-lamb comparison was analyzed and it was found that the ewes had significantly higher levels of serum-globulin and total protein but not albumin.—[J. S. Dunlap and W. M. Dickson: *The Effect of Age and Pregnancy on Ovine Blood Protein Fractions*. Am. J. Vet. Res., 16, (Jan., 1955). In press.]

Rhabdomyosarcoma in a Dog

Malignant tumors of striated muscle origin (rhabdomyosarcoma) are relatively rare. In this case of an 8-year-old male English Setter, the tumor appeared on the left hind leg in the region of the stifle, and there was generalized metastasis to the lungs, liver, spleen, kidneys, mediastinal lymph nodes, and adrenal glands. A review of the literature shows that striated muscle tumors are rare. The article gives a review of the limited number of cases reported in the literature.—[Gordon Worley, Jr., M.D., and John R. Gorham, D.V.M.: *The Comparative Pathology of Rhabdomyosarcoma with a Report of a Case in a Dog*. Am. J. Path., 30, (1954): 837-849.]

FOREIGN ABSTRACTS

Experimental Therapy for Brucellosis

It was found that abortion could be produced in guinea pigs by injection of pure cultures of *Vibrio fetus* during the fifth or sixth week of pregnancy. The microorganism could be cultured from 63 per cent of these animals. The daily injection of 30 mg. of dihydrostreptomycin for four days following injection would prevent abortion. The microorganism could not be isolated from the treated guinea pigs. Treatment with arsenicals had no beneficial effect. In cows, the intrauterine administration of dihydrostreptomycin (1 Gm.) and penicillin (250,000 units) appeared to have no

deleterious effect, but the beneficial effect could not be assessed. Application of streptomycin ointment to the penis appeared to be of value in preventing transmission of vibriosis by a bull.—[O. Gar, H. Hoff, and O. Skjerven: *Kurative behandlingsforsok av Vibriose*. (Experiments on Therapy of Vibriosis). Nord. Vet.-med., 5, June, 1953): 401-416.]

Diagnosis of Carriers (Bulls) of *Vibrio fetus*

The diagnosis of *Vibrio fetus* in apparently healthy bulls was accomplished by inseminating heifers which were subsequently examined by biopsy and culture. Because this procedure is expensive, the author used female guinea pigs in which estrus was produced by the injection of 250 units of estradiol benzoate in animals about 70 days old. Three days after injection of the hormone, the guinea pigs were given 0.2 ml. of inoculum intravaginally and again given 250 units of estradiol. In five days, the guinea pigs were killed and the uteri removed aseptically, divided into five or more pieces, and each piece placed in Szabo's medium and incubated under CO₂ at 37°C. for ten days. Three pure cultures of *V. fetus*, as well as semen from a known carrier bull and semen from 6 suspected bulls, were used in 2 to 6 guinea pigs, respectively, and also in heifers. There was agreement between the results of the guinea pig inoculation and the heifer inoculation. However, not all of the guinea pigs in each series developed the infection. It may be necessary, therefore, to use a minimum of 6 guinea pigs for each specimen. Further studies are being made to improve the procedure.—[H. C. Alder: *Diagnosis of Vibrio fetus Carrier Bulls by Intravaginal Inoculation of Guinea Pigs*. Nord. Vet.-med., 5, (June, 1953): 454-459.]—A.G.K.

Diagnosis of Infectious Anemia in Horses

The complement-fixation method, modified by Altara, Serra, and Guarini for the diagnosis of infectious anemia in horses, has been subjected to a critical test. On account of the results of these investigations, the authors can not confirm Altara, Serra, and Guarini's opinion that the complement-fixation method recommended by these investigators is suitable for the diagnosis of infectious anemia in horses. On the contrary, the authors consider that its use causes diagnostic errors. The phenomenon which these workers considered a specific complement-fixation has apparently nothing to do with an antibody-antigen reaction but is due to nonspecific factors. Normal serums with

anemia antigen, or infectious anemia serums with spleen extract from a normal horse, in fact showed the same phenomenon of delay of the hemolysis as infectious anemia serums with infectious anemia antigen. An explanation of this phenomenon is given.—[E. Lebner and P. Viriden: *Critical Remarks to the Complement-Fixation Method Modified by Altara, Serra, and Guarini for the Diagnosis of Infectious Anemia in Horses*. Nordisk. Vet.-med., 6, 1954.]—AUTHORS' ABSTRACT.

Use of ACTH in Acetonemia

This report covers the treatment of 5 dairy cows with puerperal acetonemia, using 150 units of ACTH. Blood chemistry determinations showed a slight elevation of blood glucose in 3 cows, while 2 showed no increase. Within three days, all those showing the elevation had lowered levels, though not as low as the initial values.

From a clinical viewpoint, 2 cows recovered, 1 of which was treated before any signs of clinical ketosis developed. The author states that the dosage employed may have been too small.—[D. Talsma: *Traitemen de l'acétose puerpérale de la vache par l'hormone adrénocorticotrope (ACTH). Analyse critique de Rec. méd. vét. (Sept., 1954): 586.*]—R.F.V.

Deodorizing Action of Chlorophyll

In a controlled experiment, a 10 per cent aqueous solution of chlorophyll was placed in contact with the fumes of methylmercaptan, ether, beer, and perfumes for twelve hours up to one month. There was no apparent reduction in the intensity of the odors.

In another experiment in human subjects, 400 to 1,600 gr. of chlorophyll daily did not cause any reduction of the natural odor of urine, feces, or perspiration. It is concluded that chlorophyll has little action in eliminating natural odors.—[G. Bazille: *La chlorophylle possède-t-elle la "vertu déodorisante"?* Presse méd., 61, (Dec. 19, 1953): 1671.]—R.F.V.

Proceedings, Second Asian Conference of the International Office of Epizootics

Following are excerpts from the proceedings of the Asian Conference of the International Office of Epizootics, held in Bangkok, Feb. 13-20, 1954.

Rinderpest.—Several vaccine preparations are used in Asia for rinderpest.

In Iran, formalized tissue vaccines are prepared by the Delpy technique (1926). This vaccine is now prepared with saponin as an adjuvant and has been used very successfully, the immunity lasting at least two years.

In Iran, modified virus (goat and lapinized) vaccines have not proved as satisfactory as inactivated vaccine.

Modified virus vaccines are not without danger in countries where there are many animals which are carriers of hemazotemia.

Laos, Cambodia, and Viet-Nam use an inactivated vaccine with aluminum hydroxide.

Goat virus is used successfully in Pakistan, Burma, and Thailand. Lapinized virus is employed in Japan and Korea and its use is spreading in Asia and in countries where the goat virus causes too severe reactions. Lapinized virus may be considered safe after the one-hundredth passage.

Dr. J. R. Hudson has passed the lapinized virus through pigs and has found it satisfactory. The pig yields 800 doses.

The Pasteur Institutes of Japan, Viet-Nam, and Cambodia, and the Indian Veterinary Institutes are studying lapinized and lapinized-avianized rinderpest viruses.

Pasteurellosis.—Pasteurellosis (hemorrhagic septicemia) is prevalent in Pakistan, India, and Indonesia. In Japan, this disease has been eradicated.

Several vaccines are used to combat this disease. In India, an inactivated vaccine has been prepared at the Mukteswar Institute, which conveys protection for a short time. Recently, in Burma and Thailand, an improved vaccine, prepared by Dr. Bain from virulent cultures, using mineral oil and lanolin as adjuvants, has been used successfully.

In Iran, a vaccine prepared according to the method of Dr. Delpy, 1938, has given satisfactory results. This vaccine is prepared from selected virulent strains suspended in saponin solution which causes antilysis and acts as an adjuvant. Antilysis may also be accomplished by the use of distilled water and aluminum hydroxide substituted as an adjuvant. This vaccine produces a long period of immunity.

A commission was appointed to study pasteurellosis and the technique of preparing vaccines.

Foot-and-Mouth Disease.—In Afghanistan, Iran, and Pakistan, foot-and-mouth disease is prevalent; all three types of virus (O, H, and C) have been encountered. An imported polyvalent vaccine has been used in India. In Thailand, type A has been recognized since 1931. Cattle for export are vaccinated with Frenkel's vaccine.

In Indonesia, the production of Frenkel's vaccine is being started in Djakarta.

Hog Cholera.—The simultaneous virus-serum method is considered too dangerous and was never much used in Asian countries.

From 1928 to 1951, a formalized vaccine prepared according to the method of Terakado in Japan and of Jactot in Nhatrang has been widely used. Rubber latex is used as an adjuvant with the Jactot vaccine. Associated vaccines for hog cholera, pasteurellosis, and salmonellosis have facilitated the control of these three diseases.

Since 1951, crystal violet vaccines have been used extensively.

Recently, rabbit vaccines have been used in Formosa. Freshly prepared rovac has given satisfactory factory results.

Adaptation of lapinized virus to the goat has been tried by Dr. J. E. Lancaster of F.A.O. These experiments are being continued.—[Bull. Off. Internat. des Epizoot., 41, (1954): p. 651-717, French; pp. 718-748, English.]—J.P.S.

BOOKS AND REPORTS

Artificial Breeding and Livestock Improvement

The author has attempted to cover the general field of reproductive physiology, artificial insemination, infertility, dystocia, dairy cattle selection, and breed description in simple, nontechnical language. In some sections, he has succeeded admirably. A chapter on "How to Pick a Good Dairy Cow" is based on a University of Illinois circular and the original authors were well-informed. The breeds of cattle, sheep, and swine commonly found in the United States are briefly but adequately described. Unfortunately, taken as a whole, the book is superficial and sometimes inaccurate to the point of being misleading rather than "comprehensive and authoritative" as the cover would lead the unwary to believe.

For instance, "gilts usually reach sex maturity at three to five months." Also, a good dairy cow "must have internal glands that give forth enough of the proper hormones so as to convert the food elements into milk of good quality." Or in discussing inheritance, "when both the males and the females in a group of animals carry the same inheritance, they really breed true. Such is the case with most purebreds." Would that it were true! In a book on artificial insemination, why leave out all reference to this technique in discussing bovine trichomoniasis? Is it wise to tell a cattle breeder that "fertility is an inherited characteristic just like milk production, color of coat, or body conformation," or that "the ease with which a female first becomes pregnant" foretells her breeding capacity. To state that "When an animal is young all the secretions of the pituitary gland are used up in promoting the animal's growth" is, unfortunately, simplification at the expense of accuracy.

The reader must be forgiven his confusion when he reads—"to determine pregnancy early in a gestation period it is necessary to reach into the rectum and feel the fetus in a horn of the uterus" (p. 89), followed by, "the fetus itself cannot be felt in early pregnancy" (p. 90), then (p. 188), "there is no way to tell when cows are safely with calf or when calves can be expected."

Directors of artificial breeding programs may be surprised to learn that "proving of bulls will probably be done in herds owned by artificial breeding organizations. It will not be necessary to use dairymen's cows for experimental purposes." They may also be surprised by the implications that, "The daughters of proved sires in service by organized semen producers are averaging . . . nearly double the production average of American milk cows." Does the author mean to suggest that the difference can be attributed to artificial breeding? Organized artificial breeding is doing a good job but not that good.

The book is well bound and profusely illus-

trated. There are seventeen pictures illustrating the breeds of sheep, an equal number clarifying the chapter on "what to do in difficult calving," and many more, some of which bear a relationship to the caption under them. The book would have benefited by more detailed references to sources of information. However, it would require more than references to make this a creditable book.—[*Artificial Breeding and Livestock Improvement*. By G. W. Stamm. 304 pages. Illustrated. Windsor Press, Chicago, Ill. 1954. Price \$3.50.]—J. A. HENDERSON.

Microbiology of Meats

A revised and enlarged third edition of Dr. L. B. Jensen's book, "Microbiology of Meats," was recently released. This edition contains 6 chapters of completely new material, and the other nine chapters have been thoroughly revised. The initial chapter is a fascinating introduction and history of the foundation of food. Probably no other writer has so consistently traced the effect of food habits on civilization. This chapter could well appear in the popular press.

The text discusses the bacteriology of cured meats and the effects of curing ingredients on bacteria in meat; the bacteriology of green discoloration; comminuted meats; antemortem and postmortem studies on the bacteriology of normal tissues of swine; the microbiology of beef; the microbiology of bacon; microbial aspects of ice, freezing, and freezer storage; the action of microorganisms on fats; organoleptic problems of microbiological origin; bacterial spores in canned meats; gaseous fermentation in meat products by the genus *Bacillus*; storage of canned and packaged meats; and the bacteriology of spices, sugar, paper, and wood as they affect meat products.

Each page is footnoted with appropriate references, several hundred references being given.

The tremendous advances in food bacteriology in the last ten years have made it difficult for the meat processor to keep up with the literature. Dr. Jensen should be complimented on the thoroughness of the references and the complete coverage of the literature. His interpretation of the implications of the research results makes this book extremely valuable to the meat plant operator and the regulatory officials concerned.

The last chapter, "A Summary of Bacterial Food Poisoning and Care of Foods," refers the reader to the 1949 edition of "Food Poisoning" by G. M. Dack and the third edition (1950) by E. B. Dewberry. It is adequate to call attention to these problems but does not attempt to cover the field.—[*Microbiology of Meats*. By L. B. Jensen. 422 pages. The Garrard Press, Champaign, Ill. 1954. Price \$6.00.]—C. H. PALS and P. J. BRANDLY.

Correction in Book Price.—The price of the "Manual of Infertility and Artificial Insemination in Cattle" (reviewed in JOURNAL, Dec. 494) is

THE NEWS

Minneapolis Is 1955 Convention City

Ninety-Second Annual Meeting—Aug. 15-18, 1955

Committee on Local Arrangements Selected—Housing Bureau Will Handle Hotel Reservations

Minneapolis which, with St. Paul, comprises the far-famed Twin Cities of Minnesota, will be the site of the 1955 annual sessions of the AVMA. It is the hub of an extensive transportation network for the upper Middlewest and the Northwest and over 5,000 veterinarians are within a 500-mile radius. It is within a few hours by air of every corner of the country and can be reached by rail from those corners in from twenty-four to thirty-six hours.

Because of its accessibility and the large number of veterinarians within easy travel distance, it is certain that the attendance at Minneapolis in 1955 will set an all-time high for AVMA conventions. The present record is 3,516, held by the 1953 session in Toronto; Minneapolis is expected to better this figure by at least 500.

LOCAL COMMITTEE ORGANIZED

Veterinarians selected by the host organization, the Minnesota State Veterinary Medical Society, got a start on some of their convention plans as early as last July and recently completed the

roster of officers, chairmen, and chairwomen who will be responsible for various aspects of local arrangements. The roster follows:

Committee on Local Arrangements

1955 Convention

OFFICERS

General Chairman.—Dr. Fred W. Gehrman, Minneapolis.

Vice-General Chairman.—Dr. H. C. H. Kernkamp, St. Paul.

General Secretary.—Dr. B. S. Pomeroy, St. Paul.

Ex Officio.—Dr. W. L. Boyd, St. Paul.

Ex Officio.—Dr. C. F. Schlotthauer, Rochester.

COMMITTEE CHAIRMEN

Alumni Dinners.—Dr. Fred C. Driver, St. Paul.

Entertainment.—Dr. George E. Jacobi, Minneapolis.

Exhibits.—Dr. James N. Karcher, Minneapolis.

Garages, Parking, and Airports.—Dr. C. H. Schlauderaff, Red Wing.

Golf Tournament.—Dr. D. S. Steele, Minneapolis.



The Minneapolis Municipal Auditorium where the general sessions and section meetings of the AVMA Ninety-Second Annual Meeting will be held Aug. 15-18, 1955. The exhibits will also be displayed in the Auditorium.

Hotels and Housing.—Dr. C. M. Penticuff, Jr., Minneapolis.

Meeting Rooms and Equipment.—Dr. Henry J. Griffiths, St. Paul.

Publicity and Public Relations.—Dr. George G. Hartle, Minneapolis.

Reception and Hospitality.—Dr. R. Fenstermacher, St. Paul.

Registration and Information.—Dr. George E. Keller, St. Paul.

Television.—Dr. H. H. Hoyt, St. Paul.

WOMEN'S ACTIVITIES

General Chairman.—Mrs. Robert A. Merrill, St. Paul.

Co-Vice Chairman.—Mrs. W. L. Boyd, St. Paul.

Co-Vice Chairman.—Mrs. Henry E. Schwermann, New Ulm.

Secretary.—Mrs Donald B. Palmer, Wayzata.

COMMITTEE CHARMEN

Luncheon.—Mrs. C. F. Schlotthauer, Rochester.

Mrs. George E. Jacobi, Minneapolis.

Publicity.—Mrs. George G. Hartle, Minneapolis.

Mrs. John N. Campbell, St. Paul.

Reception and Hospitality.—Mrs. Paul L. Nelson, Minneapolis.

Mrs. L. R. Phipps, Winnebago.

Information.—Mrs. D. E. Trump, Owatonna.

Mrs. James N. Karcher, Minneapolis.

Sub-Teenagers.—Mrs. John P. Arnold, White Bear.

Mrs. H. H. Hoyt, St. Paul.

Tea.—Mrs. H. C. H. Kernkamp, St. Paul.

Mrs. B. S. Pomeroy, St. Paul.

Teenagers.—Mrs. E. H. Gloss, Gaylord.

Mrs. W. G. Andberg, Anoka.

HOUSING BUREAU TO HANDLE HOTEL RESERVATIONS

The Minneapolis Convention and Visitors Bureau will operate a housing bureau in cooperation with the Local Committee. This bureau will receive all reservation requests, process them, and

(Continued on page 72)

Aerial view of downtown Minneapolis, showing Municipal Auditorium in left foreground and Mississippi River in background.





News From Washington



The **regular draft and the doctor draft**, both a part of the Universal Military Training and Service Act, **expire July 1, 1955**. Secretary of Defense Charles Wilson disclosed, in a recent press conference, that the administration wants the regular draft extended four years. No statement was made concerning the position of the Department of Defense on extension of the doctor draft. The talk is that the administration will ask that either the present doctor draft law be extended or provisions be included in a rewritten basic draft bill that will assure procurement of doctors for the Armed Forces. The administration plans relative to the doctor draft are expected momentarily.

Secretary Wilson also announced that Congress will be asked to enact legislation for **readjusting and increasing the pay of the members of the military services**, establishing a system of universal military training, and overhaul and strengthen the reserve forces. The pay program would provide for selective rather than across-the-board increases by rewarding long-service men and technical specialists. Regarding the basic pay feature of the program, there have been a number of estimates by different people as to the increase which will be recommended, one being about 6 per cent.

★ ★ ★

The Tax Court of the United States, in a decision affecting 32,000 foundations and many thousands of scientists and scholars, has held that **research and study grants** from philanthropic organizations **are not taxable**. The decision, which reverses a 1951 finding of the Commissioner of Internal Revenue, holds that fellowships are gifts and therefore not taxable as such. Previous to this decision, grants were regarded as income, and taxable.

★ ★ ★

The Bureau of Customs has granted a

45-day extension of time within which to complete **return of the Charolais cattle to Mexico**. This extension was granted to permit completion of negotiations already under way. A ninety-day extension had been requested earlier and refused. It was the opinion of Customs that the 45-day extension should be granted in view of the progress of the negotiations reported to that Bureau. Presumably, if the cattle have not been returned by the time the extension expires, court action will be instituted to accomplish final disposition (see JOURNAL, Oct., 1954: 336).

★ ★ ★

Unless something unforeseen occurs between the time this item was written (Dec. 7) and Dec. 31, 1954, **Mexico will be declared free of foot-and-mouth disease** on the latter date, thus bringing to a conclusion the campaign conducted cooperatively by the United States and Mexico to eradicate the disease. With the lifting of the border quarantine it should be noted, however, that importation of cattle into the United States will be restricted to shipments from the nine northern states of Mexico which have been free of the disease.

★ ★ ★

Revised position classification standards for veterinary positions have been approved by the U. S. Civil Service Commission and received in the Agricultural Research Service, U.S.D.A. Studies are under way to ascertain the full effect of the new standards on grade levels of veterinary positions. Unless unforeseen developments occur, this study will be completed in the near future and action will be taken to implement the standards.

AVMA Office Address in Washington

Brig. General James A. McCallam (Ret.)
Room 109, 1507 M Street, N.W.
Washington 5, D.C.

(Continued from page 70)

send out confirmations. A special form for reservations will be published in the February JOURNAL and succeeding issues for several months.

MUNICIPAL AUDITORIUM WILL HOUSE SESSIONS

It should be noted that the Hotel Radisson is not included among the hotels which have allocated rooms for the convention. Since the Minneapolis convention will be held in the Municipal Auditorium, the Radisson will be headquarters for preconvention sessions of the AVMA Board of Governors, Executive Board, House of Representatives, committees, and other groups. Consequently, the bloc of rooms allocated by the Radisson will be used for housing Association officers, board members, section officers, delegates, exhibitors, and others who should be accommodated there. Reservations at the Radisson will be handled entirely by the AVMA central office in Chicago and not by the Housing Bureau in Minneapolis.

WATCH FUTURE ISSUES

In succeeding months, the JOURNAL will carry stories about Minneapolis and Minnesota, including vacation opportunities in the "Land of 10,000 Lakes" and the upper Middlewest, the many points of interest that may be visited, and transportation facilities. Because of its rather central location, the AVMA will not sponsor any tours in connection with the 1955 convention.

Veterinarian Wanted by Guam Government

The government of the Island of Guam has a vacancy for a veterinarian to be employed in its department of agriculture, on a contract basis, to carry on work in connection with a program of animal development, disease control, and research and also, later, to supervise a meat inspection program. The individual selected for the position will play a major role in developing the animal husbandry part of the whole program.

The Guam government specifies that the applicant be a graduate of an approved school and should have varied experience in the practice of veterinary medicine; a veterinarian already licensed in the States is preferred.

The salary authorized is \$5,720 per annum to which 25 per cent, or \$1,430, is added as territorial post differential, making a total annual salary of \$7,150. The position is handled on a two-year contract basis subject to renewal upon mutual agreement. The government pays full transportation, cost of personal and household effects to Guam and return to point of employment upon completion of employment.

Annual leave of thirty days is provided but the employee is requested to hold his leave until his contract is completed; if the contract is terminated, he is reimbursed for the accumulated leave; if he

renews his contract, he is allowed a transportation-paid, two to three month trip to point of recruitment before beginning the new contract.

Housing is provided by the Guam government at rentals from \$25 to \$50 per month, including utilities; these rates are subject to revision.

Any interested veterinarian should communicate with Mr. Charles M. Earl, Jr., acting director of personnel, Government of Guam, Agana, Guam.

STUDENT CHAPTER ACTIVITIES

For copy deadline, see "Among the States and Provinces"

California Chapter.—The activities of the University of California Student Chapter of the AVMA got off to a start September 29 with the annual smoker.

Dean Donald E. Jasper welcomed the new class and then introduced chairmen of the department who, in turn, introduced the various members of their departments. The students then introduced themselves, giving their class and home town. A social get together followed the meeting.

The first business meeting was held October 6, with Dr. J. E. Stuart of the California Bureau of Animal Industry, as the featured speaker. After his interesting discussion, a business session was held at which the following officers were installed. William Bayliss, president; William Rushworth, president-elect; Alex Knaizeff, vice-president; Glenn Reck, secretary; and Henry Evers, treasurer. President Bayliss gave a report as student representative to the AVMA convention in Seattle.

October 19 was movie night for the Chapter and motion pictures on mastitis, the use of phenothiazine, and demodectic mange in dogs were shown.

At the November 3 meeting, Dr. R. B. Frater, Elk Grove, was the guest speaker. President Bayliss then reported on the trip that he, Dean Jasper, and Ray Bloom had made to the Lederle laboratories at Pearl River, N. Y., as guests of the Lederle Company.

The California Chapter schedules two meetings per month. A business meeting with speakers scheduled for the first Wednesday of each month and a movie night the third Tuesday of each month.

S/GLENN RECK, Secretary.

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Georgia Chapter.—The University of Georgia Student Chapter of the AVMA is nearing 100 per cent membership and have interesting programs planned for the entire school year.

We deeply regret the loss of one of our freshmen, Donald McKinney of Vienna, Ga., who was killed in an automobile accident on Nov. 13, 1954. He had pledged to Omega Tau Sigma Fraternity and was liked very much by

all his classmates. His injuries were thought to be slight but he died of a cerebral hemorrhage a few hours after the accident.

S/HERMAN WESTMORELAND, Secretary

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Iowa Chapter.—The Iowa State College Student Chapter of the AVMA opened its fall program with a banquet at which Dr. A. H.



Left to right—Jim Creel, student chapter president, Bill Stover, Dick Baum, Dick Houck, Dean I. A. Merchant, Dr. A. H. Quin, Dr. J. H. Jensen, College provost, Carl DeZeeuw, and Marvin Mitchell.

Quin, president of the AVMA, was guest speaker. Dean I. A. Merchant, Division of Veterinary Medicine, presented the Borden Scholarship, an annual award of \$300, to Murray Fowler, senior who maintained the highest scholastic record in his class for three years. Dean Merchant also introduced the faculty and members of the freshman class.

On October 16, during Iowa State's homecoming, the Chapter sponsored the annual luncheon for graduates of the veterinary division.

Robert McClure, representative to the AVMA convention in Seattle, reported on that meeting, October 27, and Dr. L. Meyer Jones, Department of Physiology and Pharmacology, spoke of his experiences while attending a Fulbright lectureship last year in Vienna.

s/KEITH T. JOHNSON, Publicity Chairman

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Minnesota Chapter.—The University of Minnesota Student Chapter of the AVMA started the new school year successfully with approximately 90 per cent of the students as members.

The annual fall smoker was held October 16, at which time each freshman student was introduced to chapter members by an upper classman. Dean W. T. S. Thorp welcomed the new students and introduced the members of the faculty and staff.

On October 16, a student-alumni-faculty picnic was held in Como Park; following the picnic, all attended the Illinois-Minnesota football game.

At the November 10 meeting, in conjunction with Phi Zeta (honorary veterinary fraternity), the Chapter members heard Dr. Frank C. Mann, emeritus professor of surgery, Mayo Foundation, speak on experimental research

and progress in veterinary and medical science.

The Christmas party, on December 4, was an evening to be remembered, as students, faculty, and women's auxiliary put on a program of humorous skits. Refreshments and dancing followed the program.

s/LAWRENCE H. DAVIS, Secretary

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Ohio Chapter.—The total membership of the Ohio State University Student Chapter of the AVMA has reached 267, and faculty interest has increased as evidenced by greater attendance at the semimonthly meetings.

On November 3, Dr. Stanton Youngberg, former director of agriculture in the Philippines, distinguished figure in rinderpest research, and ex-prisoner of war, was an unusual guest speaker. His presentation brought an unusual applause and many complimentary remarks.

The chapter officers for the 1954-1955 school year are: Everett Fleming, Jr., president; Joe Skaggs, president-elect; David Drenan, vice-president; W. Harold Davis, secretary; Carlton C. Stanforth, treasurer; Earl Weaver, program chairman; and representatives Robert Cope (senior), John Andreas (junior), Howard Terrell (sophomore), and Howard Hartman (freshman).

As initiated by the Chapter, a committee has been appointed to draft plans for the establishment of a student council for the College of Veterinary Medicine.

s/W. HAROLD DAVIS, Secretary

WOMEN'S AUXILIARY

Student Loan Fund.—The following is a report of the administration of the Student Loan Fund of the Women's Auxiliary to the AVMA for the period 1953-1954. The balance in the fund on Aug. 1, 1953, was \$403.70 which was sufficient for one full loan.

At the final meeting of the Auxiliary executive board in Toronto, it was voted to cash our remaining bonds, which money was not received until December, 1953.

An appeal for contributions was made to all affiliated auxiliaries. During the period between August, 1953, and July, 1954, contributions were received from 28 auxiliaries. It was these contributions which made possible some of the loans granted early in the year, since but one loan was repaid before Dec. 31, 1953.

Since the annual meeting in Seattle, ten auxiliaries have made contributions, one loan has been repaid in full, and one partial payment made. One loan of \$400 has been made and another for the same amount approved.

Before Aug. 1, 1955, more than \$3,000 in outstanding notes will be due. This is the largest number of notes to come due in any one year since the loan fund was established.

Not all notes are repaid when due. Some-

times the borrowers ask for extensions, make part payment, or pay only the interest due. We always help these boys whenever possible but there are always those who take advantage.

It has been difficult from time to time, to collect notes. In such instances, we have received the cooperation of Dr. J. G. Hardenbergh, executive secretary of the AVMA, and the deans of the various colleges, state veterinarians, attorneys, and other interested parties.

Last year, a committee of which I was a member, was appointed to study the changes and additions needed in the administration of the Student Loan Fund. At a meeting of this committee, I was authorized to consult a lawyer so that all procedures would be legal and ethical. I consulted a friend who has had experience with college loan funds. He gave freely and willingly of his time and knowledge at no cost to us. He drafted all necessary form letters and suggested the following additions and changes which were accepted by the house of representatives at Seattle:

- 1) New notes which will assure collection of both principal and interest anywhere without cost to us.
- 2) Financial statement of parents to be requested.
- 3) Notice to be sent thirty days prior to date principal and/or interest will be due.
- 4) Tuition rate at school applicant is attending to be added to application. (Some applicants state that loan is to be used to pay tuition.)
- 5) Wife of applicant, fellow students, and faculty members will be excluded as guarantors.

Dr. Hardenbergh feels that faculty members will welcome their exclusion as guarantors as they are frequently placed in an embarrassing position when requested to sign notes. A financial statement helps in selecting the neediest applicants when it becomes necessary to limit the number of loans, as was the case last year. The usual procedure is to consider applications in the order in which they are received.

All suggested changes are first submitted to the AVMA office for approval. The following is a quote from a letter received from Dr. Hardenbergh. "I have read with much interest your letter and enclosures regarding operations of the student loan fund.

"In my opinion the Auxiliary is justified in doing anything it can to check the actual financial needs of the students who apply for loans. The suggestions made by your lawyer are good ones. Anything that can be done to impress upon students who obtain loans from the Auxiliary that the transaction is just as legal and binding as that made by a bank is desirable. I think that has been one of the weaknesses in the past in that an occasional student has not felt particularly concerned about repaying his obligation."

Applications are often received from students whose G.I. assistance is no longer available, from married students whose wives have been working but, for various reasons, are unable to continue to do so, and from others whose financial assistance from home is no longer forthcoming due to illness or death.

That our help has been appreciated was shown this year by a young man who included in his check for repayment of his loan a \$10 donation to our fund. Another wrote that he planned to be married soon and would make sure that his wife became a member of our auxiliary immediately.

It is evident that through the Student Loan Fund our auxiliary is helping to promote better public relations.

s/(MRS. ALFRED E.) MARIE COOMBS,
First Vice-President.

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Colorado Auxiliary.—The Women's Auxiliary to the Colorado Veterinary Medical Association met in Denver on Sept. 23-25, 1954. The following officers were elected at this meeting: Mrs. D. R. Makey, Greeley, president; Mrs. R. K. Anderson, Denver, vice-president; and Mrs. Lloyd C. Moss, Fort Collins, secretary-treasurer.

s/(MRS. LLOYD C.) PEGGY MOSS, *Secretary.*

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Pennsylvania Auxiliary.—The Women's Aux-



Top row (left to right)—Mrs. J. G. Eagelman, treasurer; Mrs. Vincent Ruth, retiring president; and Mrs. B. J. Zackon, secretary.

Bottom row—Mrs. Roy Hoffman, past president; Mrs. L. R. Richardson, president of the AVMA Women's Auxiliary; and Mrs. S. Scheidy, president, Women's Auxiliary to the state Association.

iliary to the Pennsylvania State Veterinary Medical Association met in the Terrace Lounge of the Pocono Manor Inn, Oct. 14, 1954.

During the business session, the Auxiliary voted to donate \$25 to the University of Pennsylvania Student Awards; \$10 to the Student Loan Fund of the AVMA Auxiliary; and \$25 to the AVMA Research Fund.

Mrs. Richardson, president of the Women's Auxiliary to the AVMA, then installed the following new officers: Mrs. S. Scheidy, Drexel Hill, president; Mrs. L. Krawitz, Philadelphia, president-elect.

s/Mrs. B. J. ZACKON, Secretary

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West Virginia Auxiliary.—The annual business meeting of the Women's Auxiliary to the West Virginia Veterinary Medical Association was held Oct. 31-Nov. 1, 1954, at the Morgan hotel in Morgantown.

The members enjoyed a Sunday afternoon concert at the School of Music and a banquet with their husbands Sunday evening. On Monday, there was a conducted tour of the University of West Virginia, followed by a luncheon and business session at which Mrs. Harry J. Fallon presided. Contributions were made to the Student Loan Fund and to the AVMA Research Fund. The following officers were elected for the ensuing year: Mrs. Isaac M. Maxwell, Lost Creek, president; Mrs. J. J. Spanabel, Fairmont, vice-president; and Mrs. Jack Kincaid, Parkersburg, secretary-treasurer. Mrs. J. R. Richardson, president of the national



New officers of the Women's Auxiliary to the West Virginia Veterinary Medical Association: Mrs. Isaac M. Maxwell, president; Mrs. J. J. Spanabel, vice-president; and Mrs. Jack Kincaid, secretary-treasurer.

Auxiliary, gave an excellent review of its projects and aims, and Mrs. V. H. Miller, delegate, reported on the Seattle meeting.

Dr. John Slack, professor of the University of West Virginia, presented the plans and prospects for the new medical school under construction in Morgantown.

The Auxiliary was honored in having two officers of the national Auxiliary present, Mrs. L. R. Richardson, president, and Mrs. Earl N. Moore, president-elect.

s/(Mrs. V. H.) FLORENCE MILLER, Delegate.

U. S. GOVERNMENT

Veterinary Personnel Changes.—The following changes in the force of veterinarians in the U.S.D.A. Agricultural Research Service are reported as of Nov. 19, 1954.

NEW APPOINTMENTS

Alexander G. M. Bruyns, Reno, Nev.
Joseph Caputi, Wichita, Kan.
Paul N. Holcomb, Jr., Helena, Mont.
Edward M. Joneschild, Helena, Mont.
Harry T. Larson, Madison, Wis.
Edgar D. McMurry, San Antonio, Texas.
Howard H. Reed, Jr., Denver, Colo.
Andrew F. Straughn, Raleigh, N. C.
James Varady, Los Angeles, Calif.

CANCELLATION of Appointment

William E. Keefer, Madison, Wis.

DEATH

John S. Murray, Spokane, Wash.

MILITARY FURLOUGHS

Millard L. Tierce, Jr., Fort Worth, Texas.
Harold A. Waters, New York, N. Y.

RESIGNATIONS

William W. Brown, Jr., Phoenix, Ariz.
Charles J. Coon, Sioux Falls, S. Dak.
Richard W. Hughes, Beltsville, Md.
Leonard E. Levine, Newark, N. J.
Robert Livengood, Waterloo, Iowa.
Wallace E. Mattson, Madison, Wis.
Carl F. Wells, Omaha, Neb.
Earl W. Youngblood, St. Louis, Mo.

RETIREMENTS

William H. Frakes, Austin, Minn.
George W. Winkler, Indianapolis, Ind.

CANCELLATION of Retirement

Earl W. Youngblood, St. Louis, Mo.

TRANSFERS

Samuel J. Berger, from Providence, R. I., to Indianapolis, Ind.

Warren J. Comstock, from Providence, R. I., to Boston, Mass.

Robert G. Freil, from Mexico City, Mex., to Boston, Mass.

Carl D. Griffin, from Fort Worth, Texas, to San Francisco, Calif.

Robert M. Holbert, from Mexico City, Mex., to Salt Lake City, Utah.

Robert P. McCoy, Jr., from Denver, Colo., to Nampa, Idaho.

Ableck J. MacGilvray, from Houston, Texas, to Albany, N. Y.

Richard E. Mott, from Oklahoma City, Okla., to Sacramento, Calif.

Joseph S. Ruhe, from Little Rock, Ark., to Houston, Texas.

Harry W. Schoening, from Washington, D. C., to Beltsville, Md.

William J. Sullivan, from Providence, R. I., to Boston, Mass.

Willard G. Walter, from Mason City, Iowa, to Sioux Falls, S. Dak.

Oscar E. Watson, from Indianapolis, Ind., to South St. Joseph, Mo.

Harold E. Wilson, from Chicago, Ill., to National Stockyards, Ill.

RETURN from Military Furlough and Transfer

Harry B. Mitchell, from Salt Lake City, Utah, to Waterloo, Iowa.

APPLICATIONS

Applicants — Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative By-Laws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., the names of applicants residing within the jurisdictional limits of the constituent associations shall be published once in the JOURNAL.

The following applicants have been certified as members of the constituent association that has jurisdiction over the area in which the applicant resides. This certification was made by the secretary of the constituent association in accordance with Section 2, Article X, of the Administrative By-Laws.

- BASSINOV, EDWARD A.
No. Main St., Roxboro, N. Car.
D.V.M., Middlesex University, 1945.
- BUZZETTI, R. J.
Alden, Iowa.
D.V.M., Iowa State College, 1949.
- CARBONE, MAURO G.
615 N. Glebe Rd., Arlington, Va.
D.V.M., Middlesex University, 1945.
- EPSTEIN, EDWIN E.
4877 Natural Bridge Ave., St. Louis, Mo.
D.V.M., Middlesex University, 1944.
- FRIEDMAN, PAUL
Piney Forest Rd., Danville, Va.
D.V.M., Middlesex University, 1944.
- GLASOFER, SEYMOUR
4504 Jefferson Ave., Newport News, Va.
D.V.M., Middlesex University, 1943.
- GOLDEN, CARL B.
92 Prospect Park West, Brooklyn, N. Y.
D.V.M., Alford National Veterinary College,
1952.
- HADYSZEWSKY, M.
515 8th St., N. E., Calgary, Alta.
D.V.M., University of Leipzig, 1945.
- KAVIT, ARTHUR Y.
5206 Lakeside Ave., Richmond, Va.
D.V.M., Middlesex University, 1946.
- KOWALCZYK, TADEUSZ
Department of Veterinary Science, University
of Wisconsin, Madison, Wis.
D.V.M., Veterinary College of Hannover, Ger-
many, 1946.
- KRAMER, EDWARD A.
3328 S. Claiborne Ave., New Orleans, La.
D.V.M., Middlesex University, 1946.
- LITWACK, MARTIN
1425 Beaver Dam Rd., Raleigh, N. Car.
D.V.M., Middlesex University, 1945.
- LORING, MURRAY
1441 Richmond Rd., Williamsburg, Va.
D.V.M., Middlesex University, 1944.
- MCGOWAN, JOHN E.
Box 1151, Ponoka, Alta.
D.V.M., Ontario Veterinary College, 1954.
- McMICHAEL, WILLIAM W.
410 Globe Building, St. Paul, Minn.
D.V.M., Colorado A. & M. College, 1935.
- MAKINSON, HENRY N.
Rt. 1, Box 1099, Pompano Beach, Fla.
D.V.M., Alabama Polytechnic Institute, 1949.
- NEWMAN, H. CARLTON
Box 145, Merrifield, Va.
D.V.M., Middlesex University, 1944.
- OLSON, LOUIS
1227 22nd Ave., N. E., Minneapolis, Minn.
D.V.M., Chicago Veterinary College, 1914.
- PARKER, MANFRED
Rt. 8, Fayetteville, Ark.
D.V.M., Middlesex University, 1944.
- PARVEY, JUSTIN J.
8607 Brookshire Lane, University City, Mo.
D.V.M., Middlesex University, 1946.
- RENSICK, SAMUEL
412 E. Glebe Rd., Alexandria, Va.
D.V.M., Middlesex University, 1945.
- REUBER, H. W.
Veterinary Clinic, Iowa State College, Ames,
Iowa.
D.V.M., Ontario Veterinary College, 1944.
- ROGERS, ALVIN G.
Smithfield, Va.
D.V.M., Middlesex University, 1944.
- ROGERS, LESTER
P. O. Box 8, Siler City, N. Car.
D.V.M., Middlesex University, 1947.
- SCHULHOF, JOSEPH L.
Box 458, Hopewell, Va.
D.V.M., Middlesex University, 1943.
- SEIDEMAN, SIDNEY
220 W. Johnson St., Philadelphia, Pa.
V.M.D., University of Pennsylvania, 1932.
- SMITH, WILLIAM H.
645 Walnut Lane, Harrisonburg, Va.
D.V.M., Texas A. & M. College, 1954.
- VINE, LOUIS L.
P. O. Box 503, Chapel Hill, N. Car.
D.V.M., Middlesex University, 1944.
- WENTWORTH, JAMES E.
410 Globe Bldg., St. Paul, Minn.
D.V.M., Kansas City Veterinary College, 1912.
- WERRING, DANIEL F.
410 Globe Bldg., St. Paul, Minn.
D.V.M., Iowa State College, 1940.
- ZULLO, EDWARD A.
121 W. Central St., Natick, Mass.
D.V.M., Middlesex University, 1944.
- Applicants — Not Members of Constituent Associations**
- In accordance with paragraph (b) of Section 2, Article X, of the Administrative By-Laws, as revised at the annual meeting of the House of Representatives, Aug. 18,

1951, in Milwaukee, Wis., notice of all applications from applicants residing outside of the jurisdictional limits of the constituent associations, and members of the Armed Forces, shall be published in the JOURNAL for two successive months. The first notice shall give the applicant's full name, school, and year of graduation, post office address, and the names of his endorsers.

First Listing

STONEBRAKER, ERNEST K.

1006 Cape Gloucester Ave., Wherry Housing,
Barstow, Calif.
D.V.M., Kansas State College, 1944.
Vouchers: R. McNellis and G. W. Cofer.

Second Listing

FLYNN, JOHN T., 6332 Lindell Ave., Rivera, Calif.
HANCOCK, SAMUEL E., JR., Office of the port
Veterinarian, New Orleans Port of Embarkation,
New Orleans, La.

CEBALLO, HUMBERTO, 2da Avenida Entre Calles
12 & 13, Los Jardines de El Valle, Caracas,
Venezuela.

WRIGHT, WILLARD H., 6624 32nd Place, N. W.,
Washington, D. C.

1954 Graduate Applicants

The following are graduates who have recently received their veterinary degree and who have applied for AVMA membership under the provision granted in the Administrative By-Laws to members in good standing of student chapters. Applications from this year's senior classes not received in time for listing this month will appear in later issues. An asterisk (*) after the name of a school indicates that all of this year's graduates have made application for membership.

First Listing

Texas A. & M. College

CRESS, RONALD D., D.V.M.
Box 717, Idaho Falls, Idaho.
Vouchers: B. E. Alldredge and J. D. Williams.

Tuskegee Institute

JEFFRIES, ROLAND S., D.V.M.
Box 87, Modesto, Calif.
Vouchers: M. V. Weathersby and G. W. Cooper.

Second Listing

University of California

SHERMAN, FREDERICK E., D.V.M., 28 Valley St.,
Pasadena, Calif.
TILLEMA, JOHN, D.V.M., 44848 N. Yucca Ave.,
Lancaster, Calif.

Colorado A. & M. College

WOLFF, WILLIAM A., D.V.M., Rt. 1, Box 457 A.,
Arvada, Colo.

University of Illinois

HEMBROUGH, FREDERICK B., D.V.M., 699 Caldwell,
Jacksonville, Ill.

AMONG THE STATES AND PROVINCES

The deadline for News copy is the 24th of the month, two months preceding the month of issue.

Arizona

Central Association Organized.—Officers of the recently organized Central Arizona Veterinary Medical Association are Drs. E. R. Hinshaw, Buckeye, president; Bela Marriasy, Phoenix, vice-president; and Frank Benton, Mesa, secretary-treasurer. The following will serve on the board of directors: Drs. Donald Miller, Phoenix; and L. N. Butler, Glendale.

The new association will meet the second Tuesday of each month.

S/J. E. SHARKEY, Resident Secretary.

California

Central Association.—On November 23, the Central California Veterinary Medical Association met in the Cypress Room of the Hotel Californian in Fresno.

The guest speakers were Drs. Edward Rhode, large animal clinician, and Ghery Pettit, small animal specialist, both of the School of Veterinary Medicine, University of California, Davis. S/HERBERT N. PIPER, Secretary.

Florida

State Association.—At the annual meeting of the Florida State Veterinary Medical Association recently, the following officers were elected: Drs. Jack O. Knowles, Miami, presi-



New officers of the Florida State Veterinary Medical Association are (left to right)—Drs. Jack O. Knowles, president; Peter Roy, vice-president; Ralph Porter, Quincy, treasurer; and Robert Knowles, secretary.

dent; Peter Roy, Jacksonville, vice-president; Robert Knowles, Miami, secretary; and Ralph Porter, Quincy, treasurer.

The principal speakers were Drs. Wade O. Brinker, School of Veterinary Medicine, Michigan State College, East Lansing; D. F. Bunce, Armour Laboratories, Chicago; Joseph E. Burnside, toxicologist, Georgia State Depart-

ment of Animal Diseases; **W. R. Dennis**, University of Florida, Gainesville; **H. L. Easterbrooks**, University of Connecticut, Storrs; **J. E. Greene**, School of Veterinary Medicine, Alabama Polytechnic Institute; **M. P. Hines**, director, North Carolina veterinary public health program; **Robert Hollis**, Abbott Veterinary Laboratories, Chicago; **George T. Harrell**, dean of the Medical School, University of Florida, Gainesville; and **Virgil B. Robinson**, Pitman-Moore Co., Zionsville, Ind.

The business sessions were preceded by a golf tournament, with members competing for trophies and other prizes. Other highlights of the social agenda were a barbecue on St. Petersburg's Gulf Beach, accompanied by water ballet, and a full schedule of events for the Women's Auxiliary.

Hawaii

Territorial Association.—The annual meeting of the Hawaii Territorial Veterinary Association was held in Honolulu on Sept. 11, 1954.

The following speakers presented papers during the scientific sessions: **Drs. G. C. Folger**, Lanikai; **Ernest H. Willers**, Honolulu; **Wilson M. Pang**, Honolulu; and **John M. Gooch**, Kaneohe.

New officers of the Association are Drs. Wilson M. Pang, president; John Gooch, vice-president; and Roy Harada, secretary-treasurer.

S/WILSON M. PANG,
Resident Territorial Secretary

Illinois

Chicago Anti-Cruelty Society Enlarges Facilities.—The Anti-Cruelty Society of Chicago, one of the leading organizations in the humane field in this country, celebrated the addition of new facilities for its charitable work with animals when it formally opened on Nov. 5, 1954,

an annex to its 18-year-old building at 157 West Grand Ave., Chicago. The addition is known as the Hulbert Memorial Annex and is named after the late Mrs. Emily D. Hulbert, long-time member and director of the Society, who left a generous bequest to be used for constructing more kennels and other facilities needed in the Society's program.

The annex, which is shown at the left in the architect's drawing, contains a new waiting room for charity clinic patients, 46 new kennels, extra facilities for cats, and two isolation wards. One floor is reserved for educational activities.

The Society was organized in 1899. Its managing director is Mr. J. J. Shaffer, formerly of the AVMA staff, and its veterinary staff includes Dr. E. R. Maschgan, chief veterinarian, Dr. Jo Anne Schmidt, and two assistants.

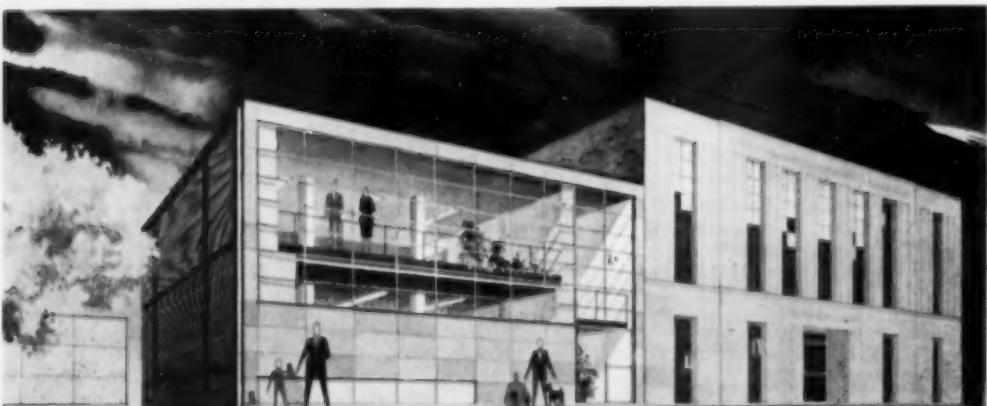
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Short Course in Poultry Diseases.—A short course in poultry diseases, for graduate veterinarians, was held Dec. 2, 1954, at the College of Veterinary Medicine, University of Illinois, Urbana.

Those who participated in the program were **Drs. J. O. Alberts**, **L. E. Hanson**, **H. E. Rhoades**, **P. H. White**, and **P. B. Barto**, of the faculty of the College of Veterinary Medicine.

Indiana

Meeting on Brucellosis Control.—On Nov. 3, 1954, the following groups were represented at a meeting called to discuss brucellosis control: U.S.D.A., Drs. Asa Winter, Arlington, Va., L. R. Barnes, Albany, N. Y., and A. A. Johnson, Indianapolis; department of state veterinarian, Drs. D. T. Ralph and T. H. Phillips; and others from the Indiana Livestock Sanitary Board, the Board of Directors of the Indiana



Architect's drawing of the new annex to the facilities of Chicago's Anti-Cruelty Society. New addition (left) adjoins the existing headquarters.

State Veterinary Medical Association, State Board of Health, and the Indiana Farm Bureau. This meeting proved profitable from the standpoint of a better understanding among those necessarily interested in speeding up action to reduce the incidence of brucellosis. It was apparent that there was a satisfactory agreement among those in attendance.

s/J. L. KIXMILLER, Resident Secretary

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Central Association.—On November 3, the Central Indiana Veterinary Medical Association met in Indianapolis and elected the following officers: Drs. J. L. Axby, Indianapolis, president; George Burch, New Augusta, vice-president; and Larry Borst, Indianapolis, secretary-treasurer.

The guest speaker at this program was Dr. Virgil Robinson of the pathological Pitman-Moore Company, Zionsville. He spoke on histoplasmosis in the dog.

s/J. L. KIXMILLER, Resident Secretary

* * *

Northeastern Association.—The Northeastern Indiana Veterinary Medical Association held its November 9 meeting in Angola. The guest speakers were Dr. P. R. Linton, of the State Veterinary Department, who spoke on brucellosis; and Dr. E. S. Weisner of Gorham, president of the state Association.

New officers of this Association are Drs. H. J. Walko, Bluffton, president; and E. V. Blume, Butler, secretary-treasurer.

s/J. L. KIXMILLER, Resident Secretary

* * *

Ninth District Association.—On Oct. 29, 1954, the Ninth District (Ind.) Veterinary Medical Association met in Seymour to hear Dr. D. C. Wood of Greensburg discuss hormones and their practical application in large animals, principally cattle.

The following officers were elected: Drs. R. S. Boren, Greenwood, president; and George W. Davis, Franklin, secretary-treasurer.

s/J. L. KIXMILLER, Resident Secretary

* * *

Michiana Association.—On Oct. 14, 1954, the Michiana Veterinary Medical Association held its monthly meeting in the Hotel LaSalle, South Bend, with a sizeable group in attendance.

Following the business meeting, Dr. Henry Lidikay, Darlington, discussed problems encountered in large animal practice.

s/PAUL W. HOUGHT, Secretary

* * *

Tenth District Association.—The Tenth District (Ind.) Veterinary Medical Association was held in Greenfield on November 18. The guest speaker was Dr. T. B. Snodgrass of the Pitman-Moore Laboratories, Zionsville, who spoke on polio vaccine and its production.

The new officers of this Association are Drs. Robert Miller, Richmond, president; Frank Gos-

sett, Greenfield, vice-president; and Robert Ensign, New Castle, secretary-treasurer.

s/J. L. KIXMILLER, Resident Secretary

* * *

Wabash Valley Association.—On Nov. 17, 1954, the Wabash Valley Veterinary Medical Association met in Huntington to hear Dr. John Dick of the Fort Dodge Laboratories, Fort Dodge, Iowa, discuss diseases of swine. Dr. Dick illustrated his talk with slides.

New officers of this Association are Drs. Robert Hafner, Huntington, president; H. A. Stevens, North Manchester, vice-president; and P. C. Clinger, Rochester, secretary-treasurer.

Dr. and Mrs. H. M. Densey and Dr. and Mrs. Robert Hafner of Huntington were hosts.

s/J. L. KIXMILLER, Resident Secretary

* * *

Personal.—Dr. A. F. Ferguson (CVC '18), LaFontaine, was convinced of the advisability of removing keys and locking the car after his Willis jeep station wagon, with his equipment, was stolen October 30. His instruments and drugs were later found in Kentucky and the car in Stanton, Tenn.

s/J. L. KIXMILLER, Resident Secretary

Iowa

Interstate Association.—The fortieth annual meeting of the Interstate Veterinary Medical Association was held at the Martin Hotel, Sioux City, on Oct. 28-29, 1954.

The following guest speakers participated in the program: Drs. E. J. Frick, Kansas State College, Manhattan; C. L. Davis, U.S.D.A., Denver, Colo.; John McIlroy, Omaha, Neb.; Floyd Cross, Fort Collins, Colo., president-elect of the AVMA; G. K. L. Underberg, Kansas State College, Manhattan; A. H. Graige, Jr., Pitman-Moore Company, Indianapolis, Ind.; John W. Gowen, Iowa State College, Ames; and Ralph L. West, Livestock Sanitary Board, St. Paul, Minn.

The new officers of the Association are Drs. O. H. Stalheim, Vermillion, S. Dak., president; Norman W. Kruse, Genoa, Neb., president-elect; Fred A. Bohmker, Sioux City, Iowa, secretary; and John Aiken, South Sioux City, Neb., treasurer.

s/FRED A. BOHMKER, Secretary

* * *

Midwest Small Animal Association and Regional Meeting of A.A.H.A.—The annual meeting of the Midwest Small Animal Association and the regional meeting of the American Animal Hospital Association were held jointly in the Hotel Burlington, Burlington, Iowa, on Nov. 10-11, 1954.

The following speakers comprised the program: Drs. Charles W. Bower, Topeka, Kan.; Lendall K. Firth, Canton, Ohio; Ralph L. Messer, Kansas City, Kan.; S. W. Haigler, St. Louis, Mo., H. L. Decker, Indianapolis, Ind.;

George G. Freier, Benton Harbor, Mich.; **Raymond W. Worley**, South Bend, Ind.; **A. Grant Misener**, Chicago; **Mr. Walter C. Lawrence**, R.C.A., Camden, N. J.; **Frank R. Booth**, Elkhart, Ind.; **Darrell S. Steele**, Minneapolis, Minn.; **William F. Irwin**, Tulsa, Okla.; **Theodore A. Kragness**, Chicago; **Jack R. Dinsmore**, Glenview, Ill.; **Dale R. Stephenson**, Rockford, Ill.; **Mark E. Davenport**, Chicago; **Timothy H. Brasmer**, and **R. E. Witter**, Danville, Ill.; **J. Porter Coble**, Springfield, Ill.; and **Arthur R. Theobald**, Cincinnati, Ohio.

s/J. PORTER COBLE, Secretary,
Midwest Small Animal Association.

Massachusetts

State Association.—The regular monthly meeting of the Massachusetts Veterinary Association was held at the Hotel Beaconsfield, Boston, Nov. 17, 1954. After the business session, **Dr. J. H. Gillespie** of the Veterinary Virus Research Institute, Cornell University, Ithaca, N. Y., discussed virus diseases of dogs.

s/C. LAWRENCE BLAKELY, Secretary.

Michigan

Southeastern Association.—On Nov. 30, 1954, the Southeastern Michigan Veterinary Medical Association met at the Croatian Center near Detroit. **Dr. Robert Willson**, Detroit, spoke on "Veterinary Observations on a European Trip."

The annual Christmas party was held December 22, with the refreshments and program planned by the women's auxiliary.

s/GILBERT MEYER, Secretary.

Missouri

Kansas City Association.—On November 16, the Kansas City Veterinary Medical Association met in the Exchange Hall for their monthly meeting. The feature speaker, **Dr. Herbert P. Wessels** of Geneva, Ill., spoke on dairy cattle practice with emphasis on the problems of mastitis.

s/J. C. DAVIS, Secretary.

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Greater St. Louis Association.—On November 5, the Greater St. Louis Veterinary Medical Association met at the Sheraton Hotel. The guest speakers were **Drs. James Brockman** and **John Stearn**, Department of Neuropsychiatry, Washington University School of Medicine.

s/LUTHER E. FREDRICKSON, Secretary.

New Jersey

Metropolitan Association.—On Dec. 15, 1954, **Dr. Gerry B. Schnelle**, chief of staff, Angell Memorial Animal Hospital, Boston, Mass., presented a paper on referred clients and allied matters before the scientific session of the Metropolitan New Jersey Veterinary Medical Association.

s/MYRON S. ARLEIN, Secretary.

New York

Officers of Public Health Veterinarians.—At the Oct. 11, 1954, Conference of Public Health Veterinarians, in Buffalo, N. Y., the following officers were elected: Brig. General Wayne O. Kester, Washington, D. C., president; Drs. Raymond J. Helwig, Washington, D. C., president-elect; and James Lieberman, Albany, N. Y., secretary-treasurer. The executive board consists of the officers and Dr. E. R. Price, Jefferson City, Mo.; Col. Philip R. Carter, Chicago, Ill.; Drs. James E. Scatterday, Jacksonville, Fla.; and Ben H. Dean (*ex officio*), Piedmont, Calif.

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New York City Association.—The regular meeting of the Veterinary Medical Association of New York City, Inc., was held Dec. 1, 1954, at the New York Academy of Sciences. **Dr. J. Archibald**, Small Animal Department, Ontario Veterinary College, Guelph, discussed canine pediatrics, with illustrations.

s/C. E. DeCAMP, Secretary.

Oregon

State Association.—The fall meeting of the Oregon State Veterinary Medical Association was held in Portland on Oct. 30, 1954.

The principal speakers were **Drs. A. G. Beagle**, U.S.D.A., Agricultural Research Service; **L. M. Koger**, Ontario, Ore.; **K. J. Peterson**, state veterinarian; **C. A. Bjork**, Portland; and **W. N. Weller**, Ashland.

The following officers were elected: Drs. R. R. Younce, Hillsboro, president; L. M. Koger, Ontario, president-elect; and E. L. Holden, Oswego, secretary-treasurer. The new board members are Drs. E. L. Henkel, Silverton; K. J. Peterson, Salem; Wm. E. Ruggles, Portland; and J. L. Adams, Oregon City.

The following were admitted into membership of the Association: Drs. W. B. Clizer, Stanfield; R. A. Minor, Portland; R. H. Perkins, Nehalem; and P. P. Souaillard, Coos Bay.

s/EDWARD L. HOLDEN, Resident Secretary.

Pennsylvania

Keystone Association and Regional Meeting of A.A.H.A.—The regional meeting of the American Animal Hospital Association was held jointly with the Keystone Veterinary Medical Association at the School of Veterinary Medicine, University of Pennsylvania, Philadelphia, on Dec. 8, 1954.

The following members of the faculty of the School of Veterinary Medicine participated in the program: **Drs. Robert S. Brodey**, **Frank Kral**, **Francis G. Fielder**, and **Jacques Jenny**. **Drs. John T. McGrath**, Drexel Hill, and **William C. Glenny**, Wynnewood, also presented papers during the scientific session.

s/LEONARD KRAWITZ, Secretary,
Keystone Veterinary Medical Association.

École de Médecine Vétérinaire de la Province de Québec, St. Hyacinthe



Fig. 1—This fine, new, natural stone building, 212 by 50 feet, provides the main offices and the classrooms and laboratories for teaching all basic sciences except anatomy. It also provides an auditorium seating 300 persons, a library, and a student lounge. The street it faces has been renamed "la Avenue Médecine de Vétérinaire."

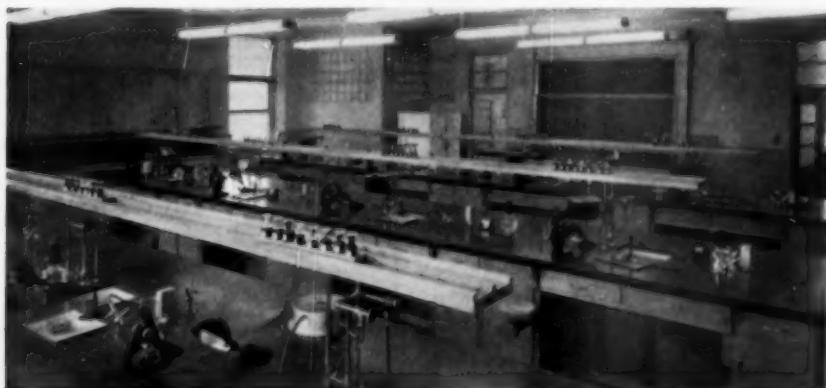


Fig. 2—This microbiology laboratory accommodates 48 students. It is a marked improvement over the temporary features of the barracks-like buildings used since the school moved from Oka to St. Hyacinthe in 1947.



Fig. 3—The full-time members of the faculty (15 D.V.M.'s, 1 M.Sc.), seated (left to right) are Drs. Jacques Saint-Georges, secretary; Gustave Lebel, dean; Joseph Dufresne, director of studies; J. D. Nadeau, administrator. Standing (left to right) are Drs. Jean Flipo, René Pelletier, Laurent P. E. Choquette; Philodore Choquette, Mr. Robert Gauvin, M.Sc.; Drs. Guy Cousineau; Gérard Lemire; Jean Guy Lefortune; Clément Trudeau; Louis-de-G. Gélinas; Lucien Cournoyer; and Martin Trépanier.

Washington

State Association.—The annual meeting of the Washington State Veterinary Medical Association was held at the Winthrop Hotel in Tacoma on Nov. 19-20, 1954.

Some of the outstanding program speakers were Drs. C. P. Larson (M.D.), medical pathologist, Tacoma; A. K. Kuttler, U. S. ARS, Washington, D. C.; E. C. Stone, dean, School of Veterinary Medicine, State College of Washington, Pullman; Mr. R. W. Bucklin, director of public relations for the Aluminum Company of America; Drs. Fred M. Shigley and A. E. Crouse, Olympia; P. M. Hinze, Carnation; R. G. MacKintosh, Yakima; Don Vetter, Raymond; C. O. Seward, Bremerton; Mr. Fred Kropf, extension specialist on poisonous plants and weeds; Drs. G. D. Duby, Centralia; G. R. Spencer, Gordon Keown, and R. L. Ott, State College of Washington, Pullman; and L. M. Koger, Ontario, Ore.

S/I ERICKSON, Secretary

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Dr. William MacKintosh Attacked in Nairobi.—Dr. Peter G. MacKintosh (MCK '16) of Yakima, Wash., reports a hair-raising experience of his brother, Dr. William "Bill" MacKintosh (MCK '17), who served as a captain of the British Army Veterinary Corps in World War I. After further schooling at the Royal Dick College at Edinburgh, Scotland, he joined the British Colonial Service in Uganda, British East Africa, in 1922. He became the director of veterinary service there before he retired in 1948 to live on a farm near Nairobi.

Recently while alone and finishing milking, he was attacked by four native terrorists with spears and *simis* (24-in. knives). Only because he was in a small shed where they could not wield their weapons and because he was able to keep the native who had grabbed him between himself and the others did he survive. He managed to force them outside and lock the door. He was cut and bruised on the shoulder by a *simi*, and his gun was stolen from his holster. The terrorists fled after Mrs. MacKintosh, whom he met and married in America, sent out an alarm. He commented that "had there been more room in the shed or had they caught me in the open I wouldn't have stood a chance."

West Virginia

State Association.—The West Virginia Veterinary Medical Association held its fall meeting Oct. 30-Nov. 1, 1954, at the Hotel Morgan in Morgantown.

The following speakers addressed the group: Drs. Frank Hale, Beckley; W. F. Hoffman, Pittsburgh, Pa.; G. C. Anderson, N. O. Olson, and D. A. Munroe, University of West Vir-

ginia, Morgantown; J. O. Heishman, Wardensville; James P. Bailey, Bluefield; Harry J. Fallon, Huntington; David E. Bartlett, American Breeders Service, Chicago; and Leo Kotchek, Kingwood.

The following officers were elected: Drs. James F. Mann, Jr., Lewisburg, president; Norman O. Olson, Morgantown, president-elect; E. R. Coon, Charleston, secretary-treasurer. Other members of the executive board are Drs. V. L. Miller, Charleston; J. O. Heishman, Wardensville; and Neill E. Bush, Elkins.

Dr. John H. Reitz, Morgantown, was elected to honorary membership for long, distinguished, and meritorious service to the organization.

Social activities included a banquet and attendance at the West Virginia-Pittsburgh football game.

S/HARRY J. FALLON, Acting Secretary

Wisconsin

Northeastern Association Honors Dr. Beach.

—At the annual meeting of the Northeastern Wisconsin Veterinary Medical Association held in Appleton, on Oct. 27, 1954, Dr. B. A. Beach (OSU '09), professor emeritus at the University of Wisconsin, was honored at a banquet attended by 70 veterinarians and friends.

Officers elected at this meeting were Drs. B. E. Mleziva, Denmark, president; W. J. Ernst, Clintonville, vice-president; William Mason, Appleton, secretary; H. R. Trombley, Appleton, treasurer; and H. G. Fehl, Sturgeon Bay, trustee.

S/WILLIAM MADSON, Secretary

Wyoming

Conference for Veterinarians.

Approximately 50 veterinarians met in Casper on November 14 for a midyear conference. Dr. R. I. Port, Sundance, president of the Wyoming V.M.A., presided. The accelerated brucellosis program was the main topic of the meeting. Dr. A. K. Kuttler, chief of the Brucellosis Eradication Division of the U.S.D.A., explained the program as proposed. Dr. George N. Glover reported as vice-chairman of the brucellosis committee of the Wyoming V.M.A. His report covered a recent meeting in Casper in which a schedule of prices proposed by the committee was sent to Washington, D. C., and were approved as presented. Dr. G. H. Good, state veterinarian and head of the Wyoming Livestock and Sanitary Board, reported on the acceptance by the latter of the recommendations. A lengthy discussion followed and it was finally agreed to accept the program as presented. Arrangements in Casper were made under the chairmanship of Dr. A. B. Kight. All veterinarians were enthusiastic and the continuation of an annual midyear conference seems to be assured.

The group also resolved that owners should not be required to secure a tuberculin test of

their cattle when moving from one modified accredited area to another state of like status and that the possibility of the same barriers being set up in the future with brucellosis should be vigorously protested at this stage. It was felt that the promise of free movement of cattle freed of brucellosis would help the testing program but that the situation that has arisen with tuberculin test would not be helpful.

J. F. RYVV, Resident Secretary,
S/O. E. BUNNELL, Secretary.

VETERINARY MILITARY SERVICE

Colonel Elia Honored. On Nov. 1, 1954, Lt. Col. Charles V. L. Elia, chief of the Liaison, Standards and Animal Branch of the Veterinary Division, Office of the Surgeon General, was awarded the Certificate of Achievement by the Joint United States Military Aid Group, Greece. In the citation presented to him, Colonel Elia was credited with the expansion of the mobilization training base, reorganization of the veterinary depot, introduction of U. S. stock record accounting procedures, publication of the first veterinary supply catalogue in Greece, and expansion of the food inspection activities. He did all this while serving as an advisor to the Greek National Army, as a member of the Joint U. S. Military Aid Group, Greece, from March, 1952, to August, 1954. He was veterinary staff advisor to the directorate of veterinary and remount services



Lieutenant Colonel Charles V. L. Elia (right), chief of Liaison, Standards and Animal Branch, Veterinary Division, Office of the Army Surgeon General, receiving the certificate of achievement awarded by the Joint United States Military Aid Group, Greece, from Brig. Gen. Elmer W. Young, chief of the Army Veterinary Corps.

of the Greek National Army, and veterinary staff officer for the aid group.

Colonel Elia has taken up his new duties in the Office of the Surgeon General, replacing Lt. Col. W. S. Gochenour, Jr., who is now on assignment at Walter Reed Army Medical Center.



Brigadier General William E. Carraway (left), assistant commander of the 8th Infantry "Golden Arrow" Division, pins the Bronze Star on Capt. Ralph E. Thomas, San Diego, Calif., of Headquarters Detachment, 5022 ASU, during a colorful Veterans' Day ceremony at Fort Carson. Captain Thomas was cited for meritorious service in Korea.

BIRTHS

Dr. (WSC '41) and Mrs. James C. Kraft, Seattle, Wash., announce the birth of a son, Gerald Francis, on Oct. 16, 1954.

DEATHS

H. W. Barnes (UP '10), Thompson, Pa., died Aug. 5, 1954. Dr. Barnes was a general practitioner.

***Andrew Darling** (MCG '90), 87, St. Louis, Mo., died Sept. 17, 1954. Dr. Darling, who first joined the AVMA in 1890, was made a life member in 1954.

John A. Davis (CVC '16), 80, Buxton, N. Dak., died June 24, 1954. Dr. Davis, a general practitioner had been a member of the AVMA.

***Albert H. DeGroot** (GR '17), 69, Dundee, Mich., died Nov. 13, 1954. Dr. DeGroot had practiced in Dundee for thirty-four years, retiring in 1951. A World War I veteran, Dr. DeGroot had served on the village council of Dundee and had held offices in the Monroe County, Michigan State, and Ohio State Veterinary Medical Associations, and was a life member of the AVMA. He is survived by his widow, a daughter, and a granddaughter.

***John R. Durigg** (OSU '32), 47, Denver, Colo., died during 1954. Dr. Durigg, a general practitioner, was a member of the Colorado Veterinary Medical Association and of the AVMA. He is survived by his widow.

***John R. Evers** (IND '21), 60, Bristol, Wis.,

died June 7, 1954. Dr. Evers had practiced at Bristol for thirty-three years. He was a member of the Wisconsin Veterinary Medical Association and of the AVMA. He is survived by his widow, two sons, one daughter, and four grandchildren.

John W. Forest (IND '17), 85, Hope, Ind., died Oct. 13, 1954. Dr. Forest had practiced in Hope since receiving his D.V.M. degree except for four years when he served as sheriff of Bartholomew County. He is survived by his widow, one son, and one daughter.

William A. Getty (KCV '10), 71, Aurora, Mo., died Sept. 30, 1954, from a heart attack complicated with uremic poisoning. Dr. Getty had been a member of the AVMA.

S. H. Guinn (ISC '93), Marengo, Iowa, died Oct. 5, 1954. Dr. Guinn had practiced in Marengo for more than fifty years.

Charles Head (ONT '06), Regina, Sask., died Oct. 30, 1953. Dr. Head was a general practitioner.

Leo M. Heimann (IND '07), 67, Evansville, Ind., died July 6, 1954. Dr. Heimann had practiced in Evansville for almost forty-five years. He had retired recently.

Robert L. Humphrey (OVC '05), 71, Loudoun, Va., died Sept. 5, 1954. Dr. Humphrey is survived by his widow, two sons, and a daughter. He had been a member of the AVMA.

★Robert E. Ingham (OVC '39), 40, Waterville, Maine, died Aug. 4, 1954, in an automobile accident. Dr. Ingham, a general practitioner, was a member of the Maine Veterinary Medical Association and of the AVMA. He is survived by his widow and two sons.

Robert J. Kennedy (STJ '10), 75, Albany, Ill., died July 20, 1954. Dr. Kennedy, a general practitioner, had retired.

I. A. Lucas (MCK '17), Moultrie, Ga., died Aug. 14, 1954. Dr. Lucas, retired inspector in charge of meat inspection (U. S. ARS), Moultrie, was interested in boys and baseball and had coached many championship teams. He also took an active interest in civic and professional affairs and had served as a vice-president of the National Association of Federal Veterinarians. Dr. Lucas is survived by his widow, two sons, a stepson, three daughters, and five grandchildren.

Charles A. Lueder (NYA '02), 76, Jacksonville, N. Y., died Aug. 14, 1954. Dr. Lueder coached football at Cornell and West Virginia University for several years after receiving his D.V.M. degree. In 1926, he became justice of the peace in Jacksonville, N. Y., from which position he had retired only recently. Dr. Lueder is survived by his widow, two sons, a daughter and one grandchild.

James J. McCabe (CVC '13), 68, Williamsburg, Iowa, died Nov. 7, 1954. Although retired for the past few years, Dr. McCabe will be remembered by many veterinarians as traveling

representative for Vitanineral Products Company. Dr. McCabe had served as president of the Eastern Iowa Veterinary Association, Inc., the largest sectional organization of its kind, and was responsible for much of its growth.

★Frederick B. Mayer (MCK '11), 66, Canton, Pa., died in September, 1954. Dr. Mayer, a general practitioner, was a member of the Pennsylvania Veterinary Medical Association and of the AVMA. He is survived by his widow.

F. Earl Maxwell (STJ '08), 77, Kansas City, Mo., died Aug. 15, 1954. Dr. Maxwell had served for forty-four years as an inspector with the U. S. BAI. Although he had retired in 1947, he continued his work with the city until his death. He is survived by his widow. He had maintained his AVMA membership from 1917 until his retirement in 1947.

Royal F. Nordstrum (ISC '13), 65, Tucson, Ariz., died May 18, 1954. Dr. Nordstrum had served for a time with the U. S. Bureau of Animal Industry. From 1944 until 1953, when he retired, he was with the Quaker Oats Co., in Rockford, Ill.

Ernest I. Patterson (STJ '13), Savannah, Mo., died Sept. 5, 1954. Dr. Patterson had practiced for many years in Savannah. He was an active member of the Missouri Veterinary Medical Association.

S. C. Phillips (IND '07), 73, Sheridan, Ind., died in July, 1954. Dr. Phillips, a general practitioner, is survived by a son, Dr. T. H. Phillips (MSC '44) of LaPorte, Ind. He had been a member of the AVMA.

Louis J. Proper (CVC '05), 69, San Diego, Calif., died April 15, 1953. At the time of his death, Dr. Proper was employed by the County of San Diego Department of Public Health.

L. E. Sceli (KCV '17), Des Moines, Iowa, died Nov. 19, 1954. Dr. Sceli was a general practitioner. He is survived by his son, Dr. Donald E. Sceli (ISC '44) of Mitchelville, Iowa.

Harry A. Stolpestad (OSU '18), 64, Fosston, Minn., died June 16, 1954. Dr. Stolpestad, who had practiced in Fosston for thirty-six years, was also a director and the former president of the local bank.

William H. Sumner (COR '14), 62, Keene, N. H., died on June 8, 1954. Dr. Sumner, who had practiced in Keene for thirty years, was a veteran of World War I.

Ray Van Orman (COR '08), Ithaca, N. Y., died May 22, 1954. Dr. Van Orman entered government service after receiving his D.V.M. degree, and later entered private practice. From 1912 to 1920, he was assistant football coach at Cornell University and was later head football coach and director of athletics at Johns Hopkins. In 1938, he rejoined the Cornell staff. Dr. Van Orman was a member of the Beta Chapter of Alpha Psi.

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COMING MEETINGS

Notices of Coming Meetings must be received by 4th of month preceding date of issue

University of Pennsylvania. Annual conference for veterinarians. School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa., Jan. 4-5, 1955. W. LaGrange, chairman.

Arkansas Veterinary Medical Association. Annual meeting. Hotel Marion, Little Rock, Ark., Jan. 4-6, 1955. Wm. L. Thomas, 906 Broadway, Little Rock, Ark., secretary.

New York State Veterinary College. Annual conference for veterinarians. New York State Veterinary College, Cornell University, Ithaca, N. Y., Jan. 5-7, 1955. W. A. Hagan, dean.

Ohio State Veterinary Medical Association. Annual meeting. Deshler-Hilton Hotel, Columbus, Ohio, Jan. 5-7, 1955. William S. Konold, 50 East Broad Street, Columbus 15, Ohio, executive secretary.

Kansas Veterinary Medical Association. Annual convention. Town House Hotel, Kansas City, Kan., Jan. 6-8, 1955. K. Maynard Curtis, 70 Central Ave., Kansas City 18, Kan., secretary.

Tennessee Veterinary Medical Association. Annual meeting. Knoxville, Tenn., Jan. 9-11, 1955. H. W. Hayes, 734 Broadway, North East, Knoxville, Tenn., secretary.

Oklahoma Veterinary Medical Association. Annual meeting. Biltmore Hotel, Oklahoma City, Okla., Jan. 10-11, 1955. C. H. Fauks, 3421 N. W. 20 St., Oklahoma City, Okla., secretary.

Indiana Veterinary Medical Association. Annual meeting. Hotel Severin, Indianapolis, Ind., Jan. 12-14, 1955. W. W. Garverick, Zionsville, Ind., secretary.

Wisconsin Veterinary Medical Association. Annual meeting. Schroeder Hotel, Milwaukee, Wis., Jan. 12-14, 1955. B. A. Beach, 1215 Vilas Ave., Madison, Wis., secretary.

Ontario Veterinary Association. Annual meeting. King Edward Hotel, Toronto, Ont., Jan. 13-15, 1955. G. A. Edge, Box 37, Postal Station F, Toronto 5, Ont., secretary.

Texas Veterinary Medical Association. Annual meeting. Hotel Texas, Fort Worth, Texas, Jan. 16-18, 1955. Paul B. Blunt, 710 Maverick Bldg., San Antonio, Texas, secretary.

Intermountain Veterinary Medical Association. Annual meeting. Hotel Utah, Salt Lake City, Utah, Jan. 17-19, 1955. Wayne Binns, 555 N. Third St. E., Logan, Utah, secretary.

Iowa Veterinary Medical Association. Annual meeting. Hotel Fort Des Moines, Des Moines, Iowa, Jan. 18-20, 1955. F. B. Young, Waukee, Iowa, executive secretary.

Virginia Veterinary Medical Association. An-

nual meeting. Hotel John Marshall, Richmond, Va., Jan. 23-25, 1955. A. J. Sipos, 1102 State Office Bldg., Richmond, Va., secretary.

California State Veterinary Medical Association. Annual midwinter conference. Haring Hall, University of California, Davis, Calif., Jan. 24-26, 1955. Charles S. Travers, San Francisco, Calif., executive secretary.

Minnesota State Veterinary Medical Society. Annual meeting. Hotel Nicollet, Minneapolis, Minn., Jan. 24-26, 1955. B. S. Pomeroy, School of Veterinary Medicine, University of Minnesota, St. Paul 1, Minn., secretary.

North Carolina Veterinary Medical Association. Annual conference. North Carolina State College, Raleigh, N. Car., Jan. 25-28, 1955. C. D. Grinnells, North Carolina State College, chairman.

Maryland State Veterinary Medical Association. Annual winter meeting. Lord Baltimore Hotel, Baltimore, Md., Jan. 27-28, 1955. John D. Gadd, Cockeysville, Md., secretary.

Oregon State Veterinary Medical Association. Annual meeting. Multnomah Hotel, Portland, Ore., Jan. 28-29, 1955. E. L. Holden, Osergo, Ore., secretary.

Louisiana State University. Annual conference for veterinarians. Louisiana State University, Baton Rouge, La., Feb. 1-2, 1955. W. T. Oglesby, head, Department of Veterinary Science.

New Jersey, Veterinary Medical Association of. Annual meeting. Hotel Essex House, 1050 Broad St., Newark, N. J., Feb. 3-4, 1955. J. R. Porteus, P. O. Box 938, Trenton 5, N. J., resident secretary.

Illinois State Veterinary Medical Association. Annual meeting. LaSalle Hotel, Chicago, Ill.,

(Continued on p. 32)

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Feb. 13-16, 1955. C. B. Hostetler, 1385 Whitcomb Ave., Des Plaines, Ill., executive secretary.

West Virginia Veterinary Medical Association. Winter meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., Feb. 20-21, 1955. V. H. Miller, Box 2881, Charleston, W. Va., acting secretary.

Missouri Veterinary Medical Association. Annual meeting, Hotel Jefferson, St. Louis, Mo., Feb. 21-22, 1955. Anthony R. Bott, 102 Osage Dr., Collinsville, Ill., chairman, local arrangements.

Colorado A. & M. College. Annual conference for veterinarians. Glover Veterinary Hospital, School of Veterinary Medicine, Colorado A. & M. College, Fort Collins, Colo., Feb. 21-23, 1955. O. R. Adams, professor and director of clinics and surgery.

Alabama Veterinary Medical Association. Annual meeting, Thomas Jefferson Hotel, Birmingham, Ala., March 20-22, 1955. M. K. Heath, Auburn, Ala., secretary.

Washington, State College of. Annual conference for veterinarians. College of Veterinary Medicine, Washington State College, Pullman, Wash., April 4-6, 1955. R. W. Leader, State College of Washington, Pullman, Wash.

American Animal Hospital Association. Annual meeting, Hotel Statler, Detroit, Mich., May 4-7, 1955. Wayne H. Riser, Skokie, Ill., executive secretary.

Pennsylvania, University of. Postgraduate short courses for veterinarians. School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa., April 4-7, 1955. M. W. Allam, dean.

Maryland State Veterinary Medical Association. Summer meeting, George Washington Hotel, Ocean City, Md., June 23-24, 1955. John D. Gadd, Cockeysville, Md., secretary. American Veterinary Medical Association. Annual meeting, Municipal Auditorium, Minneapolis, Minn., Aug. 15-18, 1955. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

New York State Veterinary Medical Society. Annual meeting, Hotel Statler, New York, N. Y., Sept. 14-16, 1955. Joan S. Halat, 803 Varick St., Utica, N. Y., acting executive secretary.

(Continued on p. 34)

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— —
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in full color is one of a
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Farm Quarterly, stressing
the necessity of proper
diagnosis by veterinarians.

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improved ways of producing Squibb veterinary products . . . to assure highest uniformity, purity, and efficacy.

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For prompt, accurate diagnosis, always consult your veterinarian.



CONSTANT RESEARCH
—Squibb scientists are constantly seeking and discovering new and better drugs . . . to aid your veterinarian in bringing better health to your livestock.

SQUIBB — A NAME YOU CAN TRUST

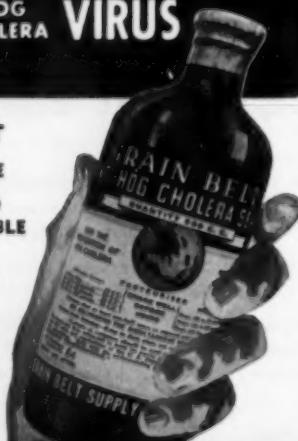
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* Produced for the exclusive use of the Graduate Licensed Veterinarian

Grain Belt Supply Company
4901 SO. 33RD STREET, OMAHA, NEBRASKA
Member Associated Serum Producers Inc.

(COMING MEETINGS—continued from p. 32)

Regularly Scheduled Meetings

Atlanta Veterinary Society, the first Tuesday of every month. C. L. Bromley, Jr., 1634 Northside Dr., Atlanta Ga., secretary.

Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m. at the Park Plaza Hotel, Charles and Madison Streets, Baltimore, Md. Victor I. Sorgen, 133 Wiltshire Rd., Baltimore 21, Md., secretary.

Bay Counties Veterinary Medical Association, the second Tuesday of each month. George W. Eberhart, El Cerrito, Calif., secretary.

Cedar Valley Veterinary Association, the second Monday of each month, except July and August, at Black's Tea Room, Waterloo, Iowa.

D. A. Buchanan, Grundy Center, Iowa, secretary.

Central Arizona Veterinary Medical Association, the second Tuesday of each month. Frank Benton, Mesa, Ariz., secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. Herbert Piper, 4990 Ventura Ave., Fresno, Calif., secretary.

Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel in Greensboro. Dr. J. S. Ellis, 2450 Battleground Ave., Greensboro, N. Car., secretary.

Central Indiana Veterinary Medical Association, the second Wednesday of each month. L. M. Borst, 3315 Shelby St., Indianapolis, Ind., secretary.

Chicago Veterinary Medical Association, the second Tuesday of each month. Wayne H. Riser, 5335 Touhy Ave., Skokie, Ill., secretary.

Coastal Bend Veterinary Association (Texas), the second Wednesday of each month. J. E. Hoban, 4301 S. Port Ave., Corpus Christi, Texas, secretary.

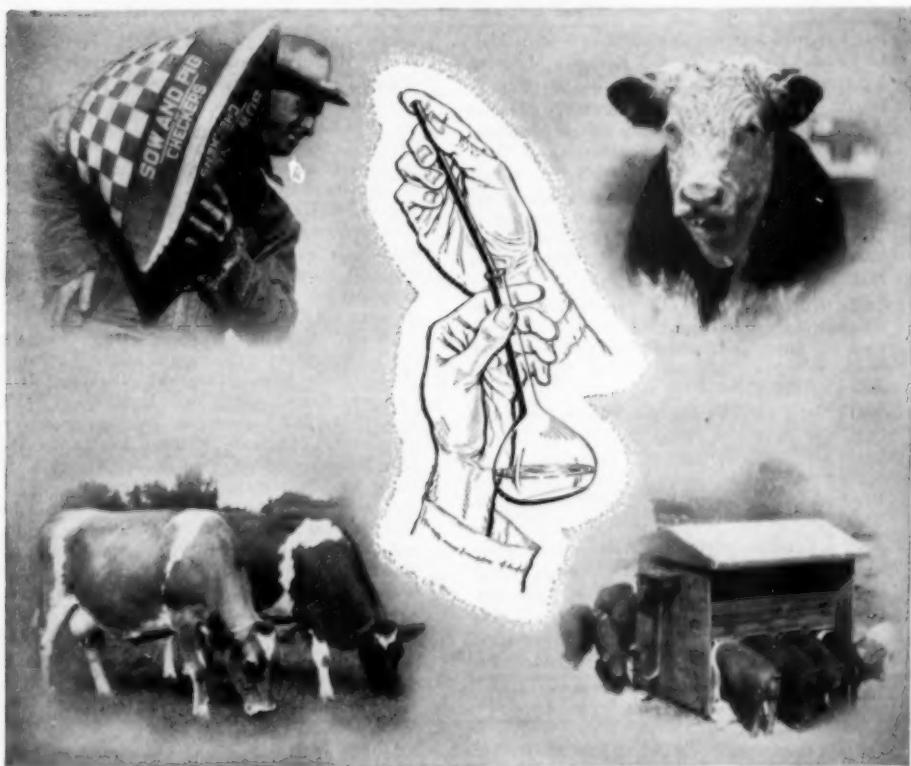
Coon Valley Veterinary Association, the second Wednesday of each month, September through May, at the Bradford Hotel, Storm Lake, Iowa. J. R. Rodlail, Pomeroy, Iowa, secretary.

Cuyahoga County (Cleveland, Ohio) Veterinary Medical Association, the first Wednesday of each month—September through May (except January)—at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. Roger W. Grundish, 4217 Mayfield Road, South Euclid 21, Ohio, secretary.

East Bay Veterinary Medical Association, bi-monthly, the fourth Wednesday. Robert Clemens, 23352 Orchard, Hayward, Calif., secretary.

Eastern Illinois Veterinary Medical Association, the first Thursday of March, June, September,

(Continued on p. 36)



nutrition is our business

Here at Purina our work in nutritional research never stops. Around the clock you'll find Purina folks in the laboratories; at our three research farms; or in our complete library of research facts from all over the world. Each of our people is a member of the Checkerboard team that for 60 years has contributed so much to modern livestock nutrition.

As our researchers unfold these mysteries of nutrition, we, as specialists in that field, take on additional responsibilities to our boss—the American farmer. He

demands that we put our findings in his hands just as soon as we know them to be sound and profitable. He knows they will show up as improved feeding results from the Checkerboard bag.

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and December. A one-day clinic is held in May. L. E. St. Clair, College of Veterinary Medicine, University of Illinois, Urbana, Ill., secretary.

Eastern North Carolina Veterinary Medical Association, the first Friday of each month, time and place specified monthly. C. B. Randall, Kinston, N. Car., secretary.

Fayette County Veterinary Association, Iowa, the third Tuesday of each month, except in July and August, at Pa and Ma's Restaurant, West Union, Iowa. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Florida, North-East Florida Veterinary Medical Association, the second Thursday of each month, time and place specified monthly. J. O. Whiddon, 829 San Marco Blvd., Jacksonville, Fla.

Greater St. Louis Veterinary Medical Association, the first Friday of the month (except July and August) at the Sheraton Hotel, Spring Ave. and Lindell Blvd. Luther E. Fredrickson, Room 11, Municipal Courts Bldg., St. Louis, Mo., secretary.

Houston Veterinary Medical Association, Houston, Texas, the first Thursday of each month. Edward Lepon, Houston, Texas, secretary-treasurer.

Illinois Valley Veterinary Medical Association, the second Sunday evening of even-numbered

months at the Jefferson Hotel, Peoria, Ill. S. M. McCully, Lacon, Ill., secretary.

Indiana Tenth District Veterinary Medical Association, third Thursday of each month. L. A. Snider, New Palestine, Ind., secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday evening of each month, in Louisville or within a radius of 50 miles. Dr. W. E. Bewley, P.O. Box "H", Crestwood, Ky., secretary.

Kansas City Small Animal Hospital Association, the first Monday of each month, at the Hotel Continental. J. A. Zacher, 3632 Main St., Kansas City, Mo., secretary.

Kansas City Veterinary Medical Association, the third Tuesday of each month, at the Exchange Hall, Ninth Floor, Livestock Building, 1600 Genesee, Kansas City, Mo. J. C. Davis, 7332 Canterbury St., Kansas City 13, Mo., secretary.

Kern County Veterinary Medical Association, the first Thursday of each month. R. A. Siern, 17 Nile St., Bakersfield, Calif., secretary.

Keystone Veterinary Medical Association, the Philadelphia County Medical Society Building, 301 S. 21st Street, Philadelphia, Pa., on the fourth Wednesday of each month. Raymond C. Snyder, 39th and Woodland Ave., Philadelphia 4, Pa., secretary.

Kyowa Veterinary Medical Association, the

(Continued on p. 371)



Model 4-3M for example, is supplied with either 1cc or 3cc glass liner, calibrated for deliveries within dual range of 0.1 to 1.0cc and 0.5 to 3.0cc respectively.

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- second Thursday of each month in the Hotel Prichard, Huntington, W. Va., at 8:30 p.m. Karl Mayer, 1531 Fourth Ave., Huntington, W. Va., secretary.
- Maricopa County Veterinary Association, the second Tuesday of each month. Charles J. Prchal, 1722 East Almeria Road, Phoenix, Ariz., secretary.
- Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from September through May, at the Academy of Medicine of Northern New Jersey, 91 Lincoln Park South, Newark, N. J. Myron S. Arlein, 2172 Millburn Ave., Maplewood, N. J., secretary.
- Michigan Veterinary Medical Association, the second Thursday of each month, at the Hotel LaSalle, South Bend, Ind. Paul W. Hough, 829 Bryan St., South Bend, Ind., secretary.
- Michigan, Southeastern Veterinary Medical Association, the second Thursday of every month, September through May. Gilbert Meyer, 14003 E. Seven Mile Road, Detroit 5, Mich., secretary.
- Mid-Coast Veterinary Medical Association, the first Thursday of every even month. George McCollister, 2146 Broad St., San Luis Obispo, Calif., secretary.
- Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. George F.
- Lynch, 201 West Devon St., Milwaukee 17, Wis., secretary.
- Mobile-Baldwin Veterinary Medical Association, the first Tuesday of each month at the Hotel Admiral Simmes, Mobile, Ala. C. Eric Kennedy, Mobile, Ala., secretary.
- Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. Lewis J. Campbell, 66 Marion Ave., Salinas, Calif., secretary.
- New Castle County (Del.) Veterinary Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. Arthur P. Coogan, 2102 New Road, Wilmington 5, Del., secretary.
- New York City, Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.
- Northern Colorado Veterinary Medical Association, the second Monday of each month. William D. Carlson, P.O. Box 478, Fort Collins, Colo., secretary.
- Northern New Jersey Veterinary Association, the fourth Tuesday evening from September through June, at the Casa Mana Restaurant, Cedar Lane, Teaneck, N. J. Robert R. Shomer, 1680 Teaneck Road, N. J., secretary.

(Continued on p. 381)

SELF FILLING SYRINGE

The multi-injector's third hand



Another accurate smooth working ground glass barrel — leak proof metal plunger instrument with many possibilities. Adjustable for any capacity. By attaching one end of a rubber tube to the self-filling syringe and the other to a bottle of serum or vaccine any number of quick 1/4cc to 5cc accurate dose injections can be made. The instrument is operated with one hand. Anyone who injects a large number of animals will find the Self-Filling Syringe will pay for itself both in labor and serum saved after the first day's use.

Sizes 2cc and 5cc

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Sold to veterinarians only

Formula HA is a product of Ultra Life Laboratories, Inc., East St. Louis, Illinois

(COMING MEETINGS—continued from p. 37)

Northern San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month. Tom Hagan, Gen. Del., Escalon, Calif., secretary.

Oklahoma County Veterinary Medical Association, the second Wednesday of every month except August and July. R. J. Keller, 1701 N. Highland Drive, Oklahoma City, Okla., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month at 7:00 p.m. in the Antlers Hotel, San Bernardino, Calif. William J. Kelber, 1111 West A St., Ontario, Calif., secretary.

Orange County Veterinary Medical Association, bi-monthly. Donald E. Lind, 2643 N. Main, Santa Ana, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. P. H. Hand, Box 1035, Millbrae, Calif., secretary.

Piedmont Veterinary Medical Association, the last Friday of each month at 7:00 p.m. in Mull's Motel in Hickory, N. Car. G. V. McCranie, Hickory, N. Car., secretary.

(Continued on p. 39)

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Destroys fungi; sarcoptes scabiei canis; demodex canis; mites; fleas; lice. Repels ticks. Non Staining; not greasy; has no objectionable odor; destroys odors of external origin. Non Toxic; may be used daily in recommended dilution. Concentrated; one gallon makes four.

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\$13.95

Makes 4 gallons

Quart

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Pima County (Arizona) Veterinary Medical Association, the third Wednesday of each month, in Tucson. R. W. Adami, 2103 S. 6th Ave., Tucson, Ariz., resident secretary.

Portland (Oregon) Veterinary Medical Association, the second Tuesday of each month, in the Auditorium of the Upjohn Company, Victor T. Oliver, 9705 S.W. Barbur Blvd., Portland 19, Ore., secretary.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. H. M. Strandberg, 203 D St., Petaluma, Calif., secretary.

Sacramento Valley Veterinary Medical Association, the second Wednesday of each month. S. M. Foster, 430 College, Woodland, Calif., secretary.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. F. Ferguson, 1702 S. Dort Highway, Flint, Mich., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month except July and August. E. R. Quortrup, 4005 Rosecrans St., Building 2, San Diego, Calif., secretary.

San Fernando Valley (California) Veterinary Medical Association, the second Friday night of each month at Eaton's Restaurant in Studio City, Calif. Howard C. Taylor, 2811 W. Olive Ave., Burbank, Calif., secretary.

Santa Barbara-Ventura Counties Veterinary Medical Association, Friday evenings every sixth week. Dee Wodars McDermott, 5879 Hollister, Coleta, Calif., secretary.

Seattle Veterinary Medical Association, the third Monday of each month in the home of Dr. Fred Cummings, 5828-5th, N.W., Seattle, Wash.

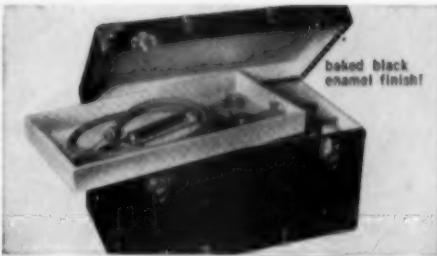
Southern California Veterinary Medical Association, the third Wednesday of each month. Rankin W. McIntyre, 203 Administration Building, Union Stockyards, Los Angeles, Calif., secretary.

South Florida Veterinary Society, the third Tuesday of each month, at the Seven Seas Restaurant, Miami, Fla. E. A. Majilton, 1093 N. E. 79th St., Miami, Fla., secretary.

South Puget Sound Veterinary Medical Association, the second Thursday of each month, except July and August. Irwin Erickson, Experiment Station, Puyallup, Wash., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month, in Director's Parlor of the Brookside State Bank, Tulsa, Okla. John Carnes, Muskogee, Okla., secretary.

Goats should be clipped over the entire body each spring.—*Dai. Goat J., Oct. 4, 1954,*



NOW! Steel sheathed veterinary cases for your drugs, serums, instruments

Our steel-sheathed cases for serums and instruments are really built to take the beating they get bumping around from farm to farm. Walls are made of heavy plywood, then covered with sheet steel. Black enamel finish is baked on. Corners heavily reinforced. Trim, latches, corner braces of solid brass.

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electric firing iron in case

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New NICHOLSON hi-current firing iron gives even heat on half the current

Our new 1955 *hi-current* firing iron is now ready for shipment. With a new, greatly improved transformer, this unit uses *half* the power formerly needed. Only 600 watts! This means you get constant, even heat in barns with old wiring.

You can use the new NICHOLSON electric firing iron and cautery in many simple surgical operations such as removal of warty growths, ear polypi, certain tumors, and in castration or spaying. And, of course, for firing, it is unexcelled. Heat is instant—and constant at any one of the three "heats" you select, 110 v AC. Comes in steel covered case with washable black lining. Supplied complete with 11 tips and points.

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100 mg., 500 mg., 1.0 Gm., 5.0 Gm.
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100 mg., 25's-100's; 250 mg., 16's-100's
POLYOTIC MARTIS OINTMENT, ½ oz.
POLYOTIC OPHTHALMIC OINTMENT 1%
6 x ½ oz.
POLYOTIC TOPICAL OINTMENT 3%, 1 oz.
POLYOTIC SORBIC [Tinned] POWDER,
14 lbs., ½ lb.-1 lb.-5 lb.

AVIANIZED[®] RABIES VACCINE (Canine)

1 dose-5 x 1 dose-10 doses

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Vaccine, 2 vials Sterile Diluent, 2 cc.

Anti-Palm DISTEMPER SERUM, 30 cc.

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105 Wurtemburg Street,
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Mr. N. S. Mountain,
Trade Commissioner for New Zealand,
609 Sun Life Building,
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Mr. C. H. Courtney, Secretary,
Veterinary Services Council,
P. O. Box 5201,
Wellington, New Zealand.

CLASSIFIED ADVERTISEMENTS

CHANGE OF RATES

Effective with the January, 1955, issue

Personal Want Ads—\$4.00 for the first 25 words and 10 cents for each additional word; 35 cents for use of box number.

Commercial Want Ads—\$5.00 for the first 25 words, 25 cents for each additional word.

Remittance must accompany order.

Deadline for want ads 8th of month preceding date of issue.

Names of classified advertisers using key letters can not be supplied. Address your reply to the key letters, c/o JOURNAL of the AVMA, 600 S. Michigan Ave., Chicago 5, Ill., and it will be transmitted to the advertiser.

Wanted—Veterinarians

Position available for veterinarian and manager of hospital and laboratory. San Diego Zoological Gardens, P.O. Box 551, San Diego 12, Calif. Forty-five years maximum age. Training and experience in laboratory diagnosis and preventive medicine is essential; knowledge of wild animals not prerequisite.

Veterinarian wanted for large and small animal practice. Permanent position. State qualifications, references, and salary expected in first letter. Address Black Hills Animal Hospital, Rapid City, S.D.

Woman veterinarian wants graduate woman assistant for small animal hospital in Asheville, N.C. Address "Box H 4," c/o JOURNAL of the AVMA.

Recent graduate wanted with some experience to assist in general practice in Missouri. May lead to partnership. Midwest graduate preferred; give complete details in first letter. Address "H 7," c/o JOURNAL of the AVMA.

Veterinarian wanted with New York State license for small animal practice; permanent position. Good starting salary leading to percentage. Address "Box H 8," c/o JOURNAL of the AVMA.

(Continued on p. 44)

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- Early appointment in California state government for graduate veterinarians with or without experience in practice.
- Openings principally in meat inspection at this time. Opportunities for specialization and advancement.
- Year or longer allowed to obtain California license. Salary range \$436 to \$530 for Veterinarian I.
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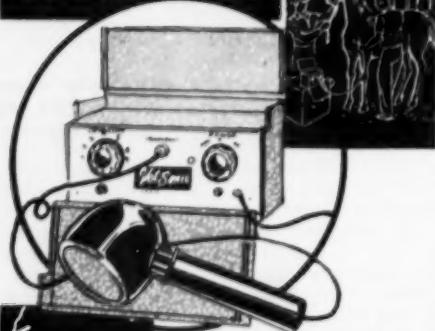
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FOR
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WILBUR RICE ASSOCIATES INC.
208 South LaSalle Street, Chicago 4, Illinois

Assistant veterinarian wanted for my thriving and still growing small animal practice in Pennsylvania city of 100,000. Brick hospital, adjoining two-story brick house with two apartments, surrounded by grounds, at main crossroads for over thirty years. For personal reasons I intend easing up in my practicing so position will lead to partnership, lease, or ownership. Address "Box H 10," c/o JOURNAL of the AVMA.

Opportunity for a young veterinarian to establish himself permanently in a growing Connecticut practice; 70% small animals. Connecticut license required. Salary and percentage. Give full details when answering. Address "Box H 9," c/o JOURNAL of the AVMA.

Veterinarian wanted as assistant in growing small animal practice; Michigan license required. Definite hours; salary basis. Please give full details and starting salary expected. Address "Box H 12," c/o JOURNAL of the AVMA.

Veterinarian wanted to supervise professional, technical, and skilled personnel on the care, diagnosis, and autopsy of small animals for research laboratory. Submit resume giving age, education, experience, and salary expected to The Ralph M. Parsons Company, Braddock Heights, Md.

Veterinarian wanted for research work on large animal diseases; some post graduate experience in bacteriology and pathology plus ability to work with ranchers required. Good opportunity for qualified man. Apply Department of Veterinary Science, University of Nevada, Reno, Nev.

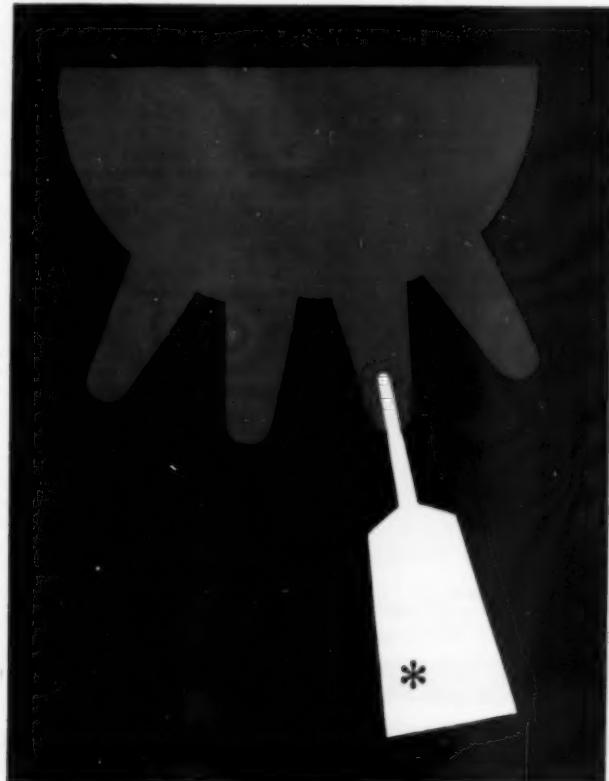
Veterinarian wanted to operate established small animal hospital on partnership basis. No capital required; excellent opportunity. Maryland license required. Address "Box H 13," c/o JOURNAL of the AVMA.

Veterinarian with practice experience, preferably in hog belt, wanted by manufacturers of veterinary biologicals. Headquarters in Sioux City, Iowa; salary, bonus, car, life and health insurance plans, retirement plan. Address "Box F 10," c/o JOURNAL of the AVMA.

(Continued on p. 46)

M·A·C
Quick relief for Bone,
Bursal or Tendon Lameness
Single Bottle.....\$2.00
3 and 1 free.....5.00
6 and 2 free.....9.00
12 and 4 free.....17.00
24 and 4 free.....28.00

CARTER-LUFF CHEMICAL CO.
Hudson, N. Y.



it fits the picture ...

It fills the requirement for effective mastitis therapy, being rapidly active against *all* the pathogens commonly associated with udder infection; it fits the picture of preferred mastitis therapy, being effective, convenient, economical and especially suitable for dispensing.

*Teatube-Neomycin

TRADEMARK, KELLCO, INC., NEW YORK.

another product of **Upjohn'**
Research for the veterinarian

Streptococci, staphylococci, coliforms and Pseudomonas are all susceptible to the action of the neomycin sulfate (500 mg. — equivalent to 350 mg. neomycin base) present in each tube (3.5 Gm.) of this milk-miscible ointment. Available: singly and in dozens.

DEPARTMENT OF VETERINARY MEDICINE / The Upjohn Company, Kalamazoo, Michigan

Veterinarian wanted with California license to operate small animal hospital on percentage basis. Northern California; excellent opportunity. Apartment available. Address "Box H 20," c/o JOURNAL of the AVMA.

Wanted—Positions

Experienced relief veterinarian available; small animals only. New York and New Jersey licenses. Address D.V.M. 1007 80th St., North Bergen, N. J.

Student desires position in small animal practice for summer before senior year. Opportunity to learn

of greatest importance. Married; children. Address "Box H 16," c/o JOURNAL of the AVMA.

Graduate recognized school with small animal experience desires association with busy small animal practitioner leading eventually to partnership or purchase. Age 28; will go anywhere. Available in April. Address "Box H 11," c/o JOURNAL of the AVMA.

Graduate of approved school desires position in research, institutional, or municipal field. Southern state preferred but not a necessity. Age 30, married. Address "Box H 23," c/o JOURNAL of the AVMA.

Reliable, experienced small animal veterinarian desires relief work in the Greater Los Angeles area, by the day, week, or month. California license; reasonable rates. Address "Box H 21," c/o JOURNAL of the AVMA.

Wanted—Practices

Want to purchase dairy practice in Washington or Oregon. Adequate cash and ten years of experience. Address "Box H 1," c/o JOURNAL of the AVMA.

Would \$10,000 investment make your practice large enough for two? Wish contact with young veterinarian with potential two-man practice who is tired of working alone. Graduate, 1952, 2½ years' mixed practice experience; married, no children. Enjoy veterinary practice. Prefer West or Southwest. Address "Box H 2," c/o JOURNAL of the AVMA.

(Continued on p. 50)

**NEW
For
MASTITIS**

- CLINICALLY PROVEN
- SYNERGISTIC
- BROAD SPECTRUM

Daribiotic*
Kassengill
NEOMYCIN-POLYMYXIN B**

Available in two sizes. Each 7.5-cc tube contains 100 mg. Neomycin Sulfate and 100,000 units Polymyxin B Sulfate. The 100-cc vial contains in each 10 cc, 100 mg. Neomycin Sulfate and 100,000 units Polymyxin B Sulfate in a free-flowing, milk-miscible base.

MASSENGILL
VETERINARY DIVISION
BRISTOL, TENNESSEE

*Patent Applied for
**Licensed under U.S.
Patent No. 2,565,057

Correspondence

Another Liger

A copy of the following letter was sent to the JOURNAL.

Dr. A. J. Louw
Bloemfontein Zoo
Bloemfontein, South Africa

Dear Dr. Louw:

I noticed with great interest on page 211 of the September, 1954, AVMA JOURNAL, the pictures of your liger and the statement that your Rajah is the only known living liger.

Since noticing the article I have had the good fortune of visiting with Mr. Robert Mattlin, director, Hogle Zoological Park, P.O. Box 2237, Salt Lake City, Utah. He informs me that they have a female liger born May, 1948, the dam of which was a liger and the sire a lion.

Perhaps you would be interested in corresponding with Mr. Mattlin regarding his animal.

Sincerely,
s/Leonard J. Goss, Assistant
Director Veterinarian.

* * *

October 12, 1954

Dr. W. A. Young, Chairman,
Humane Act Award Committee,
American Veterinary Medical Association
Chicago 5, Illinois

Dear Dr. Young:

I want you to know what a thrill it was to get your letter saying that I was the fortunate award winner this year. The engraved citation and the \$100.00 Savings bond make this a banner year for me.

I feel that the American Veterinary Medical Association has a wonderful humane program and hope that many other boys and girls will participate in this worthwhile project.

Perhaps you will be interested to know that I have received letters from all over the country congratulating me on my good fortune. One letter in particular from a 91-year-old lady from Searsport, Maine, blessing me for my contribution to animal comfort. I shall cherish this letter always, believe me.

The publicity on the award was very good for my school as well as for my community. Please convey my sincere thanks to all connected with the Humane Act for everything. You may be sure that I shall keep working for a maternity pen in every dairy barn.

Sincerely,
Alan R. Campbell,
East Corinth, Maine.



Doctor, make your small animal work easier . . . with a better light, a safer sterilizer

Whether it's a balky patient, awkward work area, or routine case—you want an operating light that focuses easily, and gives vision over a larger area even if animal moves.

Castle's new Veterinary Light swings through 355°—gives light from *any angle*. Offset Pantograph arm puts light directly over table; arm adjusts vertically within 24" range; lamp moves easily on caster base. (Wall and ceiling models also available.)

Color-correction makes diagnosis more accurate. Easy vision lessens fatigue.

Note the Castle "777" Speed-Clave. Safer, faster, easier than boiling, this autoclave destroys hepatitis virus, gives you added protection.

To: **Wilmet Castle Co.**
1139 University Avenue, Rochester 7, N.Y.

Please send free folder on how Castle equipment can help improve my hospital.

Name _____

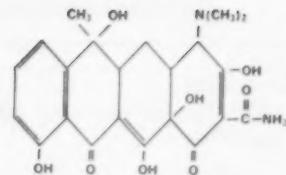
Street _____

City _____ State _____

My veterinary supply dealer is: _____

**Castle LIGHTS AND
STERILIZERS**

Basic in structure...



TETRACY

Basic in practice...



Discoverers of Tetracycline

Department of Veterinary Medicine



The basic tetracycline structure (on which oxytetracycline and chlortetracycline are built) offers basic characteristics unsurpassed by any other broad-spectrum antibiotic: rapid absorption into the blood and other body fluids; excellent compatibility with body tissues; activity against a very wide range of pathogens; excretion in therapeutic concentration through the kidneys and liver; a welcome freedom from undesirable side effects.

**For sale
to veterinarians
only**

CLINE-VET

The dosage forms of Tetracycline-Vet which are presently available are the first of a full line, and they offer basic advantages as therapeutic agents: availability restricted to veterinarians conveniently furnished for both oral and parenteral administration; satisfying effectiveness in commonly encountered conditions such as hemorrhagic septicemia, actinomycosis, diphtheria, necrotic stomatitis, pyelonephritis, erysipelas, infectious coryza, peritonitis, coccidiosis, calf scours, enteritis, lamb dysentery, pneumonia, upper respiratory complications, bacterial infections associated with canine distemper, urinary tract infections, feline enteritis, bronchitis, tonsillitis, pharyngitis, parotiditis, otitis media, strangles, metritis, equine influenza, foot rot, and other infections caused by tetracycline-sensitive organisms.

**Tetracycline-Vet
Intravenous**

250 mg., 500 mg., 1 Gm.,
and 2.5 Gm. with Water
for Injection, U.S.P.

Daily Dosage:

large animals—
1 to 2 mg. per lb.
small animals—
5 mg. per lb.

**Tetracycline-Vet
Capsules**

100 mg., in bottles of 100;
250 mg., in bottles of 16 and 100

Daily Dosage:

large animals—
5 to 10 mg. per lb.
small animals—
25 to 50 mg. per lb.

**Tetracycline-Vet
Intramuscular**

100 mg., 2.5 Gm., and 5.0 Gm.

Daily Dosage:

large animals—
1 to 2 mg. per lb.
small animals—
5 mg. per lb.

PFIZER LABORATORIES, Brooklyn 6, N.Y.
Division, Chas. Pfizer & Co., Inc.

Bovine and Equine Safety

MOUTH SPECULUM

- Safety locking feature withstands 800 lbs pressure.
- Allows adequate room for inserting arm from either side.
- Attachment available for passing stomach tube through mouth makes this operation simpler and more humane.



Price \$57.50 POST PAID For stomach tube attachment add \$18

Sold to veterinarians only by makers of famous MacAllan Ear-Cropping Forms. Send check or money order, or phone Lansing 2-3787.

MacALLAN LABORATORIES
Route No. 2, Box 420
Lansing, Michigan

(CLASSIFIED ADS—continued from p. 46)

Want to buy thriving small animal practice in Illinois, Indiana, Michigan, or Ohio. Prefer hospital with adjoining residence or apartment. Address "Box G 17," c/o JOURNAL of the AVMA.

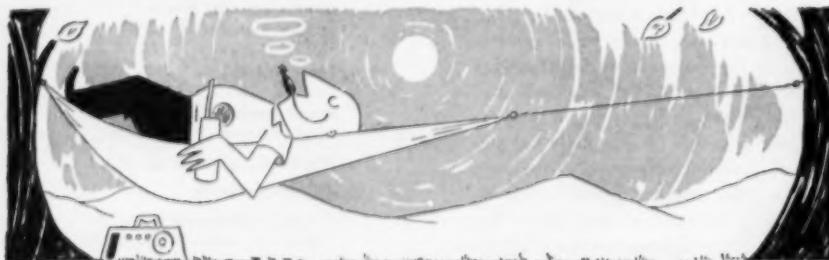
Veterinarian with ten years' experience in commercial and mixed practice desires connection with small animal hospital. If arrangements are satisfactory, will be willing to buy partnership. Address "Box H 3," c/o JOURNAL of the AVMA.

Two experienced practitioners want practice large enough for partnership with approximately 50% large animals and 50% small. Please give complete details in first letter; all inquiries will be held strictly confidential. Address "Box H 5," c/o JOURNAL of the AVMA.

Want to purchase active small animal hospital, preferably with a residence; \$25,000 available. Licensed Connecticut, New York, Pennsylvania, Maryland, Ohio. Address "Box H 18," c/o JOURNAL of the AVMA.

(Continued on p. 52)

To insure prompt delivery, replies should be carefully addressed: Complete box number as given in the ad, AVMA, 600 S. Michigan Blvd., Chicago 5, Ill.



LEISURE, LIVING AND LOAFING

BECAUSE HISTACOUNT KEEPS THE RECORDS STRAIGHT



HISTACOUNT®

Hours of desk chores can be easily converted into hammock happiness or a few holes of golf, with Histacount Bookkeeping Systems, Patients' Records and Filing Systems.

Histacount is the symbol of systematic, efficient record keeping which provides the "time off" that Doctors can never seem to find.

Professional Printing Company, Inc.
America's Largest Printers to the Professions.
New Hyde Park, New York.

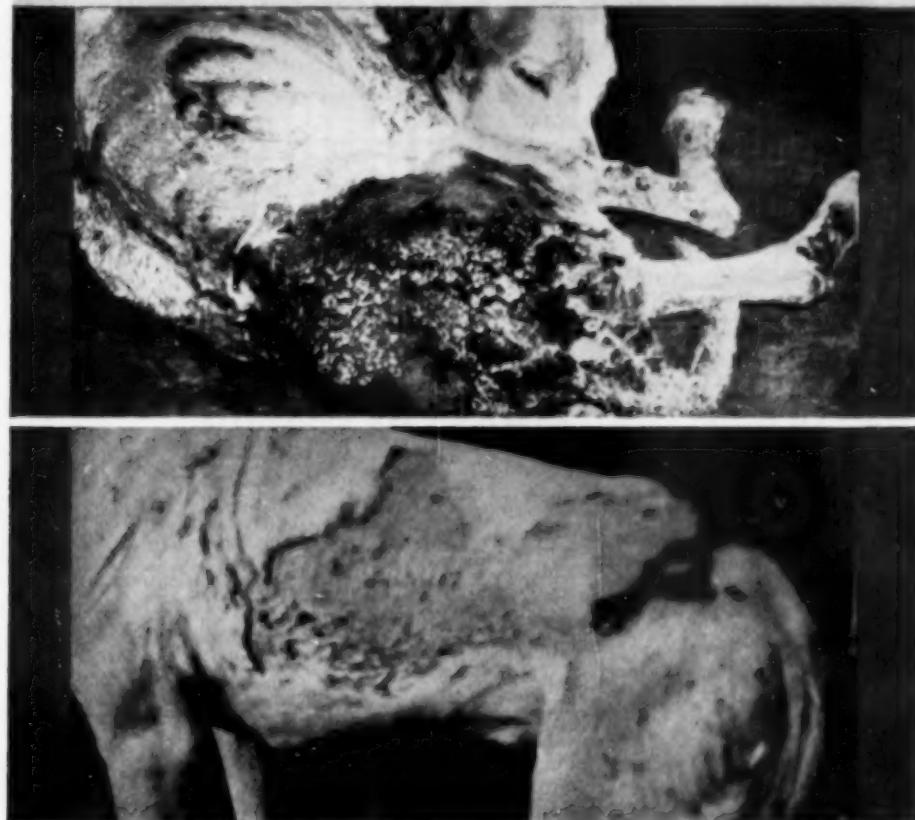
Cortone®

ACETATE

(VETERINARY) SALINE SUSPENSION
(CORTISONE ACETATE, MERCK)

When life hangs in the balance

CASE HISTORY: A dog with 2nd and 3rd degree burns covering 25% of the body surface was treated with parenterally administered 'Cortone' and other medication. After 12 days of therapy the burn was healed except for a small area. The animal's appetite and general condition were much improved.



Other indications: Bovine ketosis, hard-pad disease in dogs, and allergic dermatoses, arthritis, and, with antibiotics, in acute fulminating infections of all animals.

Supplied: 'Cortone' Acetate (Veterinary) Saline Suspension 50 mg. per cc.—10 cc. vials. Veterinary literature on 'Cortone' and 'Hydrocortone' available to veterinarians on request.

VETERINARY DEPARTMENT
U. S. VETERINARY LICENSE NO. 3

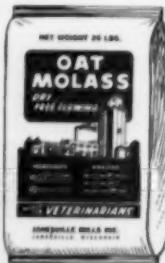


DIVISION OF MERCK & CO., INC.

(CLASSIFIED ADS—continued from p. 50)

Oat Molass

The new dry, free flowing, highly palatable molasses feed containing pulverized whole oats and corn sugar molasses.



New available in 25-lb. sacks especially for veterinarians as a carrier for phenothiazine, sodium fluoride, and antibiotics.

Recommended by universities, medical supply houses, and veterinarians.

Oat Molass is cooked, blended, and processed under pressure.

Write for samples, prices, and complete information.

JANESVILLE MILLS, INC.
411 S. Pearl St., Janesville, Wis.
Phone 3371

Mixed practice or partnership wanted in Maine or New York by experienced Cornell graduate with license in both states. Address "Box H 15," c/o JOURNAL of the AVMA.

Graduate, 1953, desires lease or purchase or position leading to same in mixed practice in northern California, Oregon, or Washington. Address "Box H 17," c/o JOURNAL of the AVMA.

For Sale or Lease—Practices

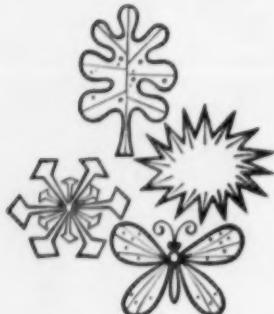
Well-equipped animal hospital for sale or lease in a southwestern town of 4,300; 80% large animals and 20% small. Graduate veterinarian left recently for other business interest. In the first ten months of 1954, he netted \$5,800; possibilities for improvement. Address "Box G 18," c/o JOURNAL of the AVMA.

(Continued on p. 54)

Send for FREE 36-page Treatise on CARROT OIL VITAMINS



Details the advantages of carrot oil vitamins when used in feeds to improve breeding results; to destroy oxidized milk flavors; and to promote general good health and glossy coats. Contains much information. Replete with data and references. Send for it today
NUTRITIONAL RESEARCH ASSOCIATES
Dept. 251-M, South Whitley, Indiana



always in season

Lameness, strains and sprains . . .
Muscle, joint and nerve inflammations . . .
Fungus infections . . .
Irritations and eruptions of the skin . . .

IODEX

cum Methyl Salicylate

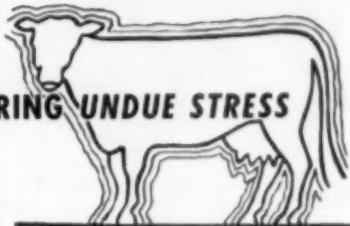
combines the stimulating and metabolic effects of iodine in Iodex and the analgesic action of methyl salicylate. Skin absorption may be aided by massage, heat or iontophoresis.

Samples and literature will be sent upon request.

MENLEY & JAMES, LTD., 70 WEST 40TH ST., N. Y. 18



FOR STIMULATING ANIMALS DURING UNDUE STRESS



**Primary ketosis of dairy cows
(if glucose therapy is utilized)***

Dehydration

Fever toxemias

Exhaustion or fatigue

Pre- and postoperative support

Management of convalescence

Cachexia

*Dynamone (Armour) cannot be considered as a replacement for Adrenomene in severe cases of primary ketosis.

2-way therapeutic action

An efficient and economical physiological stimulant, containing 100 U.S.P. units of ACTH in a 50% glucose solution. Dynamone (Armour) provides the animal with a two-fold source of energy (1) REPLACEMENT THERAPY glucose being an immediate available energy source.

(2) STIMULANT THERAPY — ACTH serves as a stimulant for adrenals providing the entire spectrum of gluco-corticoids (compound E-and F-like steroids) which in turn accelerate the conversion of fat and protein to glucose and glycogen.

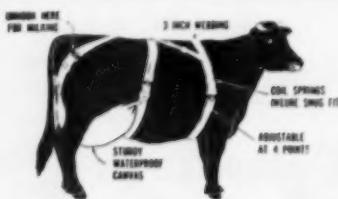
Dynamone (Armour) maintains the blood sugar concentrations at normal or above normal levels for eight or more hours and is four or more times as effective as glucose alone in maintaining blood sugar levels.



Package information: Dynamone (Armour) is available in cartons containing 6 and 12 x 500 cc. bottles.



Veterinary Laboratories
A Division of Armour and Company
520 N. Michigan Ave., Chicago 11, Ill.



Veterinarians, you can now eliminate congestion or caking, broken down udders, smashed teats, and self-sucking by using

TAMM UDDER SUPPORTS.

The sturdy, waterproof canvas udder cover is ideal for medicated baths or ice packs and will retain body temperature indefinitely. The harness is made of durable 3-in. webbing adjustable at four points and equipped with springs for a snug fit.

Available in four sizes

extra small, heifers, 900 lb. or less; *small*, 900-1,100 lb. cows; *medium*, 1,100-1,600 lb. cows; *large*, cows over 1,600 lb.

Price, \$17.50 retail, prepaid.

30% Professional Discount

Write for literature and complete information.

**FRANKSVILLE SPECIALTY CO.,
Dept. V-12, Franksville, Wis.**

Army service forces sale of Michigan practice; both large and small animals. Take over drug inventory. Address "Box H 6," c/o JOURNAL of the AVMA.

Four-room veterinary clinic and garage for sale; x-ray, instruments, drugs, etc.; \$11,000; without adjacent lot, \$8,500. Located on main highway. Address Dr. M. Parker, South 71, Fayetteville, Ark.

Established, well-equipped small animal hospital for lease in fastest growing area in Maryland. Includes 7-room house. An excellent opportunity. Address "Box H 14," c/o JOURNAL of the AVMA.

Modern small animal hospital for lease in northern California. Terrific opportunity for right party. Small apartment included. Address "Box H 19," c/o JOURNAL of the AVMA.

Established, best located dog and cat hospital in Long Beach, Calif., for lease; no investment needed, just rent and medicine. Address "Box H 22," c/o JOURNAL of the AVMA.

Small animal hospital for sale; 80% small animals, 20% large. Six-room modern home attached. Located in Iowa town of 30,000. Price, \$16,000. Address "Box H 25," c/o JOURNAL of the AVMA.

Well-equipped animal hospital for sale in Arkansas city of 18,000; 60% large animal, 40% small. Real estate, equipment and drugs; \$23,000. Veterinarian

(Continued on p. 56)

For TEAT PROBLEMS IN YOUR PRACTICE

To maintain unrestricted milk flow and provide antiseptic protection is of first importance in the care of injured teats, scab teats, and in post operative therapy.

Dr. Naylor Dilators, impregnated with Sulfathiazole, act as an internal bandage IN the teat canal. They provide gentle, non-irritating support and broad spectrum germicidal activity to injured teat mucosa. They promote normal tissue repair with a minimum of altered milking function of the streak canal. Positive retention—fit large or small teats.

STERILIZED — MEDICATED

Dr. Naylor Dilators are sterilized and medicated prior to packaging. The medication is IN the Dilators and is released slowly to maintain a prolonged antiseptic level.

Dr. Naylor's MEDICATED TEAT DILATORS

DISPENSING PACKAGE (Contains 12 Dilators) 3.00 per dz. →

DISTRIBUTORS

EASTERN:

David Yellen Co., Inc.
Canton, Massachusetts
Bedford Laboratories
Bedford, Pennsylvania
Barber Vet. Supply Co.
Richmond, Virginia
The Columbus Serum Co.
Columbus, Ohio

Chicago Vet. Supply Co.
Chicago, Illinois
Farmers Vet. Supply Co.
St. Paul, Minnesota
The Holman Serum Co.
Springfield, Illinois
National Lab. Corp.
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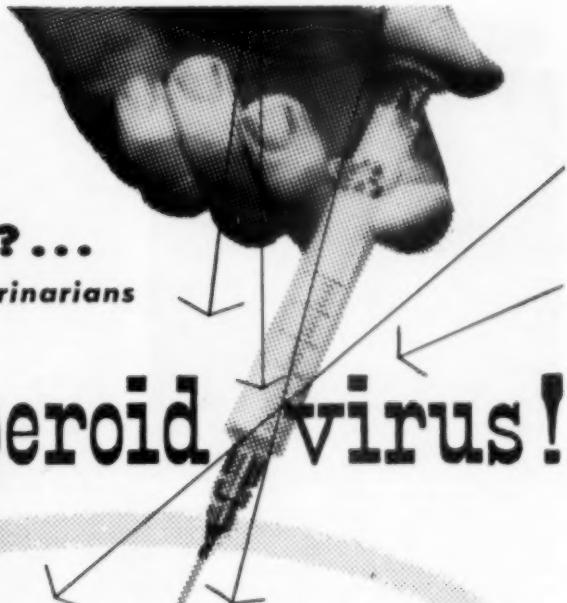
Nelson Laboratories, Inc.
Sioux Falls, South Dakota
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Patterson Laboratories
Chicago, Illinois
Wisconsin Biol. Supply Co.
Madison, Wisconsin

H. C. Burns Co., Inc.
Oakland, California
H. C. Burns Co., Inc.
Portland, Oregon

A. F. Cloutier & Cie
Montreal, Quebec, Canada
Dominion Vet. Supply
Orangeville, Ont., Can.

H. W. NAYLOR CO., MANUFACTURING CHEMISTS, MORRIS, NEW YORK





Do you know? ...

*more and more veterinarians
are now using*

distemperoid virus!



Ideal THERAPEUTIS is obtained with one vial — ample dosage for any PROPHYLACTIC injection with one vial

Many doctors report* exceedingly favorable results both PROPHYLACTICALLY and THERAPEUTICALLY in the control of Hard Pad disease

Distemperoid Virus "Viableized" FROMM is proving to be the choice of doctors for protection against canine distemper when used either PROPHYLACTICALLY or THERAPEUTICALLY. Continuing reports also show a growing preference for this vaccine for its effectiveness in the control of Hard Pad disease. Now supplied in 75 mg. vials with diluent, one dose of Distemperoid Virus is sufficient for inoculation. ADMINISTER IT WITH CONFIDENCE.

- * Signed reports in Laboratory files at Grafton
- Sold only to Qualified Graduate Veterinarians
- Available in one dose and 10 dose packages

CONTACT YOUR LOCAL INDEPENDENT DISTRIBUTOR

**FROMM
LABORATORIES
INC.**

GRAFTON, WIS., U.S.A.
PHONE CEDARBURG 811

DE LUXE CAGES



IMPROVED 7-CAGE DE LUXE DRAIN UNIT

The small size is 7½ feet long with 3-30" cages in bottom and the large unit 9 feet long with 3-36" cages in bottom.

Also available in removable tray style, or plain flat floor style without gutter drains.

Our units are available in 3, 5, 7 or 12 cage units, or any combination you need.

"We don't make all the cages but we make the best."

Write for NEW cage booklet; also DRYER FOLDER

NOTE NEW LOCATION

Baltimore Wire & Iron Works
319 Barrow Street Jersey City 2, N. J.

(CLASSIFIED ADS—continued from p. 54)

leaving to devote full time to farms but will remain to acquaint purchaser with practice. Address "Box H 24," c/o JOURNAL of the AVMA.

Lost

Lost on November 8, vicinity Lamont, Iowa, brown, long-haired, German Dachshund. Black tips on ears and tail, enlarged navel. \$20 reward. Address Mrs. O. Matteson, Lamont, Iowa.

Miscellaneous

Books on Dog Breeds—Boston Terrier, Pekingese, Dachshund, St. Bernard (\$4.00 each), Boxer, Springer Spaniel, Great Dane, Chihuahua (\$3.50 each). Keep up on all dog activities, *Dog World* magazine, \$3, 1 yr.; \$5, 2 yr. Judy Publishing Co., 3323 Michigan Blvd., Chicago 16, Ill.

We are interested in items for veterinarians. We have the largest following in the Northwest. For best promotion write to "Box F 22," c/o JOURNAL of the AVMA.

Bovine Prolapse Preventer—Payton Utero-Vaginal Prolapse Preventer quickly easily applied to any size cow. Aluminum, re-usable, nonirritating, sanitary; noninterference with placenta release. Excellent for vaginal protrusion; dispensing. See article, JOURNAL of the AVMA, Dec., 1951. Only \$3.00; two for \$5.00; six for \$12; prepaid. Dr. Jerome Payton, Morris, N.Y.

(Continued on p. 59)

IDEAL for the busy VETERINARIAN...

THE NEW **EVSCO** THREE-HEAT Hair Dryer

LOW PRICED at \$**29⁵⁰**

DESIGN FOR DRYING

- Lightweight—8½ lbs; hangs on any standard dog cage.
- Temperature (12" from nozzle)
"Lo" heat 103°F. "Hi" heat 134°F.
- Low heat, high heat, and cool air flows.
- Rubber-cushioned attachments absorb vibrations.
- Touch-of-finger operating mechanism.
- Beautiful baked enamel finish with chrome trimming.



110/120 volts.
7 ft. U.L. approved cord.
50/60 cycle AC current only.

HERE IS THE OPPORTUNITY TO OWN MORE THAN ONE DRYER.

ETHICAL VETERINARY SUPPLY CO.

34-28 31st STREET, LONG ISLAND CITY 6, N. Y.





Modified Live Virus Hog Cholera Vaccine



Three full years of experience in the field have shown that use of M-L-V and serum furnishes an extremely satisfactory method of immunization . . . offering the benefits of immediate protection, as well as long and substantial immunity. Rigid bacteriologic control insures the safety, potency and purity of this modern hog cholera vaccine.

"M-L-V" is a trade mark of Fort Dodge Laboratories, Inc.
U. S. Patent No. Re.23746.

BONUS FEEDING

Every Bag of Kasco

Gives You Extra Benefits

Scientists have proved beyond a doubt that Kasco gives more "Bonus Benefits" than any other dog food tested. From taste appeal to nutrition we guarantee you can't find a better dog food.

Get More Feedings From Every Bag

Of all the bonus benefits you get from Kasco, the MOST IMPORTANT is economy.

Compared with other nationally advertised brands tested, Kasco has no equal for its ability to keep a dog fit and save you money. NOTE: See scientific proof at left.

This means that you can get as much as an extra week's feeding from every twenty-five pound bag of Kasco compared to three other leading nationally advertised brands. That's REAL Bonus Feeding! So many feed Kasco . . . why don't you?

Here's the Proof:



ON KASCO: a 25 pound bag of Kasco will feed a Beagle perfectly for 57 days.



ON BRAND A: 25 pounds of this popular dog food will keep the same dog for just 53 days.



ON BRAND B: 25 pounds of this nationally advertised dog food will keep the same dog for 52 days.



ON BRAND C: 25 pounds of this popular, nationally advertised dog food will keep the same dog for just 50 days.

Dog-licious Kasco is a complete diet for all breeds of puppies and mature dogs. Add nothing but water.



KASCO COMPLETE DOG RATION

Manufactured by KASCO MILLS • A Division of CORN PRODUCTS SALES CO.

Pregnancy Diagnosis—in mare from 45th to 150th day. Write for vials and mailing tubes. Price: \$7.00; 2 or more tests, \$6.00 each. Pregnancy Diagnostic Laboratories, H. S. Lames, D.V.M., Dysart, Iowa.

To insure prompt delivery, replies should be carefully addressed: Complete box number as given in the ad, AVMA, 600 S. Michigan Blvd., Chicago 5, Ill.

Clipper Blade Sharpening

Have your clipper blades sharpened by an expert with 28 years of practical factory training. We know how your blades must be ground to cut like new. Also clipper repairing. All work guaranteed to satisfy you or money back. Now serving veterinary colleges, and over 700 satisfied veterinarians. Why not you? 24-hour service. We ship insured prepaid. Avoid C.O.D. charges; enclose 75 cents for each set with blades. We are headquarters for Oster and Stewart clippers and blades. Complete clipping supplies; upper and lower replacements. Write for information on Oster and Stewart quality clippers and products. Service Grinding and Supply Co., 903 Chicago St., Racine, Wis.

It takes 4 tons of feed to grow a 1,000-lb. steer which will yield 578 lb. of meat, only 20 lb. of which is porterhouse steak.—*Sci. News Letter*, Aug. 21, 1954.

Many birds eat half their weight in food each day; young birds often more.—*Sci. News Letter*, Aug. 28, 1954.

The snapping turtle never feeds out of water. It can not swallow unless its head is submerged.—*Sci. News Letter*, Oct. 2, 1954.

**CASTRATION
SAFE . . . SURE . . . EASY**

USE BURDIZZO
BLOODLESS CASTRATOR
USED SUCCESSFULLY
OVER 30 YEARS.



YOU GET —

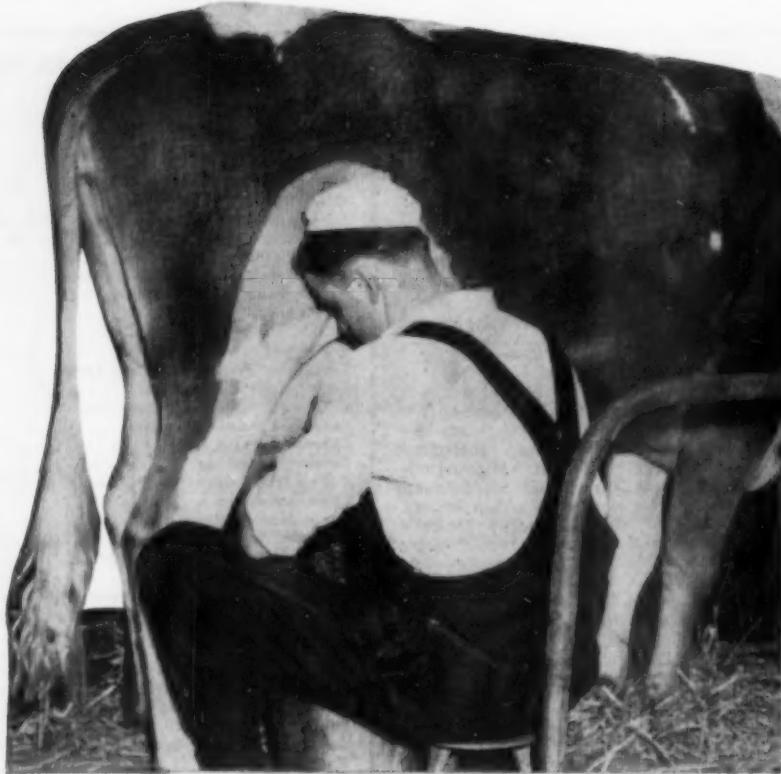
- Minimum growth set back
- No hemorrhage
- Minimum surgical shock
- No septic infection
- No maggots
- No screw worms

Ask your dealer for the original bloodless castrator made by La "Burdizzo" Co., Turin, Italy.

BE SURE IT'S BURDIZZO

Index to Advertisers in This Issue

| | |
|-------------------------------------|------------|
| Abbott Laboratories | 5 |
| Affiliated Laboratories Corporation | 6 |
| Allied Mills | 18 |
| American Optical Co. | 7 |
| Armour Veterinary Laboratories | 17, 53 |
| AVMA Report | 8 |
| Ashe Lockhart, Inc. | 3rd cover |
| Associated Serum Producers, Inc. | 24, 25 |
| Astra Pharmaceutical Products, Inc. | 31 |
| Baltimore Wire and Iron Works | 56 |
| Boston Instrument Mfg. Co., Inc. | 37 |
| Burdizzo | 59 |
| Burlington Instrument Co. | 13 |
| Burroughs Wellcome & Co. | 9 |
| California State Personnel Board | 42 |
| Carter Luff Chemical Co. | 44 |
| Chatham Pharmaceuticals, Inc. | 20 |
| Classified Advertisements | 43 |
| Clipper Service | 46 |
| Coming Meetings | 30 |
| Corn States Laboratories, Inc. | 2nd cover |
| Correspondence | 47 |
| Derm Medical Co. | 30 |
| Diamond Laboratories | 43 |
| Ethical Veterinary Supply Co. | 56 |
| Eaton Laboratories | 19 |
| Franksville Specialty Company | 54 |
| Fort Dodge Laboratories, Inc. | 28, 57 |
| Fromm Laboratories, Inc. | 55 |
| Gaines Dog Food | 10 |
| Grain Belt Supply Company | 34 |
| Haver Glover Laboratories | 60 |
| Hill Packing Company | 22 |
| Jonesville Mills, Inc. | 52 |
| Jensen-Salsbury Laboratories, Inc. | 4th cover |
| Kasco Mills, Inc. | 58 |
| Ken-L Products | 14 |
| King Research, Inc. | 12 |
| Lederle Laboratories | 40, 41 |
| Liability Insurance | 32 |
| MacAllan Laboratories | 50 |
| S. E. Massengill | 46 |
| Menley James, Ltd. | 52 |
| National Laboratories Corporation | 27 |
| H. W. Naylor Co. | 54 |
| New Zealand Council | 42 |
| Nicholson Manufacturing, Inc. | 39 |
| Norden Laboratories | 1 |
| Nutritional Research Associates | 52 |
| Osco Chemical Company, Inc. | 38 |
| Parke, Davis & Company | 29 |
| Pfizer Laboratories | 15, 48, 49 |
| Pitman-Moore Company | 3 |
| Professional Printing Company, Inc. | 50 |
| Ralston Purina Company | 35 |
| Research Laboratories, Inc. | 22, 23 |
| Sharp & Dohme, Inc. | 51 |
| Silent Glow Oil Burner Corp. | 11 |
| Ivan Servall, Inc. | 36 |
| Squibb | 33 |
| Swift and Company | 16 |
| Ultra-Life Laboratories, Inc. | 38 |
| Upjohn Company | 45 |
| Vitamineral Products Company | 26 |
| White, Dr. George Ransom | 32 |
| Wilbur Rice Associates, Inc. | 44 |
| Wilmet Castle Company | 47 |
| Winthrop Stearns, Inc. | 21 |



"back in production . . .!"

. . . that's the important thing to your client! The proof of treatment lies in the results that follow. Perhaps that's the reason many practitioners prefer P3S-10 or P2S products . . . now with cobalt . . . for the treatment of mastitis.

| P3S-10-10 cc. | |
|---------------------|---------------|
| Penicillin procaine | 500,000 units |
| Dihydrostreptomycin | 250 mg |
| Neomycin | 75 mg |
| Cobalt sulphate | 5 mg |
| Sulfanilamide | 5% |
| Sulfamerazine | 5% |
| Sulfathiazole | 10% |

| P2S Strong-7½ Gm. | |
|---------------------|---------------|
| Penicillin | 300,000 units |
| Dihydrostreptomycin | 225 mg |
| Cobalt sulphate | 5 mg |
| Sulfanilamide | 5% |
| Sulfathiazole | 5% |

| P2S-7½ Gm. | |
|---------------------|---------------|
| Penicillin | 100,000 units |
| Dihydrostreptomycin | 50 mg |
| Cobalt sulphate | 5 mg |
| Sulfanilamide | 5% |
| Sulfathiazole | 5% |

| P2S Suspension-100 cc. | |
|------------------------|--------------|
| Contains per cc. | |
| Penicillin | 10,000 units |
| Dihydrostreptomycin | 10 mg |
| Cobalt sulphate | 5 mg |
| Sulfamerazine | 7.5% |
| Sulfathiazole | 7.5% |

HAVER-GLOVER LABORATORIES
Kansas City, Mo.

Canine Distemper and Hepatitis Control

LOCKHART OFFERS ALL the necessary biological agents for adequately combatting these two major infectious diseases of dogs, including passive and active immunity for each, and combinations of products for the simultaneous development of immunity to both diseases.

1. ANTI-CANINE DISTEMPER SERUM AND ANTI-INFECTIOUS CANINE HEPATITIS SERUM — an unsurpassed protective agent against these two virus diseases of the dog and the common secondary invaders of each disease.
2. The well-known INTRADERMAL products — designed for active immunization by utilizing the skin as the organ for development of immunity.

A. INTRADERMAL CANINE DISTEMPER VACCINE

A series of two or more 1 cc. doses of Intradermal killed-virus vaccine from especially selected tissues of high virus content.

B. INTRADERMAL INFECTIOUS CANINE HEPATITIS VACCINE

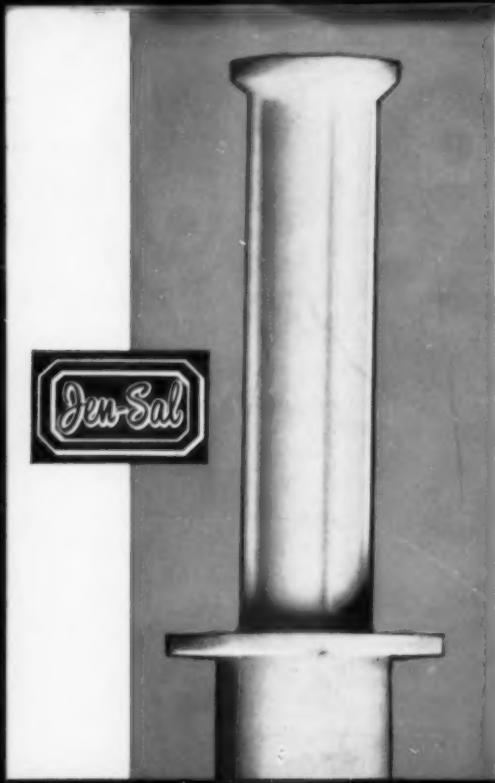
A killed-virus, single dose product, of high antigenicity and efficiency — simple and inexpensive.

C. INTRADERMAL BIVALENT VACCINE

A combination of canine distemper and infectious canine hepatitis vaccine, designed for efficiency and economy. It can be used on very young puppies to produce an active immunity to both diseases, to be "boostered" later by Intradermal Canine Distemper Vaccine or Modified Live Virus Canine Distemper Vaccine.

3. MODIFIED LIVE VIRUS CANINE DISTEMPER VACCINE, CHICK EMBRYO ORIGIN, DESICCATED — to be used alone, with Bivalent serum, or following Intradermal Canine Distemper Vaccine as a booster, depending upon the choice of the clinician. It is efficient and effective when used in any of the above ways.

ASHE LOCKHART, INC. • 800 WOODSWETHER ROAD, KANSAS CITY 5, MO.



Insti-lysin

Here is an entirely new concept in mastitis therapy. INSTI-LYSIN (JEN-SAL), the first really effective infusion for *acute* mastitis, is valuable also in *chronic* mastitis infections.

PROTEOLYTIC ENZYME: Papain (a primary ingredient in the INSTI-LYSIN formula) digests cellular debris, improves antibiotic activity and promotes reduction of swelling and inflammation.

HIGH ANTIBIOTIC ACTIVITY: Enhanced by papain, INSTI-LYSIN's 500,000 units of procaine penicillin G and 100 mg. dihydrostreptomycin maintain highudder levels with broad bacterial coverage.

EFFECTIVE SULFONAMIDE CONTENT: A full 500 mg. of phthalylsulfacetamide (outstanding gram-negative sulfonamide) plus 500 mg. sulfathiazole in a special, diffusible oil base, assure maximum antibacterial activity.

Insti-lysin

**effective new
enzyme • antibiotic • sulfonamide
treatment for mastitis**



CONVENIENT TO USE: No fumbling with separate infusion tips! The large, 28-cc. INSTI-LYSIN syringe is packaged with tip in place, ready-to-use—(just slip off the protective cap.) Each syringe is individually packed in dispensing boxes, twelve to a (display) carton. Order INSTI-LYSIN from your JEN-SAL branch or distributor.

convenient,
ready-to-use
infusion tip

Insti-lysin

Jensen-Salsbury Laboratories, Inc. Kansas City, Missouri